University of Cincinnati

Date: 11/2/2023

I, Jessica Roncker, hereby submit this original work as part of the requirements for the degree of Master of Arts in Psychology.

It is entitled:

Equitable Resilience in Climate Safe Cities: Impacts of Neighborhood-Level Community Engagement on the Perceptions and Actions of Cincinnati Residents

Student's name: **Jessica Roncker**

This work and its defense approved by:

Committee chair: Carlie Trott, Ph.D.

Committee member: Anjali Dutt, Ph.D.

Committee member: Stacie Furst-Holloway, Ph.D.

47846

Equitable Resilience in Climate Safe Cities: Impacts of Neighborhood-Level Community Engagement on the Perceptions and Actions of Cincinnati Residents

A thesis submitted to the

Graduate School

of the University of Cincinnati

in partial fulfillment of the

requirements for the degree of

Master of Arts

in the Department of Psychology

of the College of Arts and Sciences

by

Jessica Roncker

B.A. The Evergreen State College

November 2023

Committee: Carlie D. Trott, Ph.D. (Chair), Anjali Dutt, Ph.D., Stacie Furst-Holloway, Ph.D.

Abstract

Climate change is underway with its effects felt everywhere but the consequences vary greatly by location. Cities are crucial focal points as more than 265 million people, or 80% of the U.S. population, live in urban areas, making the ability of cities to adapt to climate change critical for the majority of U.S. citizens (U.S. Census Bureau, 2023). Climate planning and policymaking in cities must recognize that disinvested communities with aging infrastructure and minimal tree canopy can expose residents to radically hotter temperatures than residents of other neighborhoods (U.S. Environmental Protection Agency [EPA], 2008; Shandas et al., 2019; Hoffman et al., 2020) and is an example of how social and economic inequalities are exacerbated by climate change. Much climate planning to date has been top-down and city-wide, which overlooks neighborhood disparities and specific needs of communities, thus there is a need for research on equitable engagement strategies within cities that incorporate resident perspectives and share decision-making with residents. The purpose of this qualitative study is to explore the impacts of Climate Safe Neighborhoods (CSN), an equity-focused neighborhood-level climate planning program, on participating Cincinnati residents and resident and organizer perspectives on how CSN may promote community resilience in the face of climate change. 14 interviews with residents (n = 6) and organizers (n = 8) were analyzed using thematic analysis (Braun & Clarke, 2006) to explore how resident perceptions about local issues changed through their participation in CSN, how CSN participation affected residents' potential to act as advocates for their community, and barriers and catalysts to implementing locally relevant community change as identified by both residents and organizers of CSN. Key findings were that residents gained a deeper overall understanding of how climate issues in their community connect to each other and to their own personal lives, and those who built mutually respectful relationships with neighbors,

community organizations, and city officials were more likely to act as climate resilience advocates. Notable factors named by residents and organizers for their capacity to sustain community change in this context include the ability to navigate institutional systems, the belief that one is able to understand and influence political proceedings, the use of framing that enables climate change concepts to appeal to people with different political backgrounds, and interventions that are planned and communicated alongside realistic timelines and methods to monitor progress of results, thereby setting shared expectations for the future. Findings are intended to help researchers and practitioners create procedural roadmaps for participatory climate planning that are aligned by principle but geography- and context-specific, that result in measurable and meaningful outcomes, and that ultimately alleviate disparities between neighborhoods.

Keywords: climate adaptation; urban resilience; urban climate planning; community engagement; community-based participatory research; psychology

Acknowledgments

This study was possible thanks to the good people at Groundwork Ohio River Valley, Green Umbrella Regional Climate Collaborative, the City of Cincinnati's Office of Environment & Sustainability and the residents of Lower Price Hill who took the time to talk with me. I am grateful for funding support from the Society for the Psychological Study of Social Issues (SPSSI), the University of Cincinnati's Community Change Collaborative (C3), and from Dr. Carlie Trott's Collaborative Sustainability Lab. I greatly appreciate the mentorship and guidance that I have received from Dr. Trott over the last several years, the writing feedback and coursework from Dr. Anjali Dutt and Dr. Stacie Furst-Holloway that sharpened my thinking, and the support from my lab mates Emmanuel Sathya-Gray and Stephanie Lam. Anna Johns and Kiara Berry were insightful and immensely helpful in reading, coding, and discussing interview transcripts. Final thanks to Jocardo E. Ralston for the academic puns and perspective and our shared love for research that began in the Sands Montessori library in Cincinnati's West End.

Table of Contents

List of Tables and Figures

Equitable Resilience in Climate Safe Cities: Impacts of Neighborhood-Level Community Engagement on Perceptions and Actions of Cincinnati Residents

Climate change is underway, and its effects are felt everywhere. According to the Intergovernmental Panel on Climate Change (IPCC, 2021), floods, droughts, and extreme heat are expected to increase in frequency and severity as a result of increasing average temperatures of the earth's atmosphere. No one is immune to the impact of climate change. Its consequences, however, vary greatly by location. Cities are crucial focal points as producers of more than 70% of greenhouse gas emissions and as consumers, expending more than two-thirds of the world's energy (Fong et al., 2021). The 2020 United States Census reports that more than 265 million people, representing 80% of the population, live in urban areas, making the ability of cities to adapt to climate change critical for the majority of U.S. citizens (U.S. Census Bureau, 2023).

Within cities, climate planning and policymaking must recognize that communities do not share resources equally. Many U.S. neighborhoods whose residents are predominantly low-income or people of color reflect the legacy of discriminatory urban zoning and housing policies that fundamentally racialized housing patterns and denied people of color access to financial services and equal housing (Freund, 2007; Rothstein, 2017). Enduring signs of long-term neighborhood disinvestment include aging infrastructure and minimal tree canopy, the latter of which exacerbates the urban heat island effect (Bowler et al., 2010; Gago et al., 2013). Specifically, pockets of heat make urban areas warmer than rural surroundings and, within the same city, can expose residents to radically hotter temperatures than residents of other neighborhoods (U.S. EPA, 2008; Shandas et al., 2019; Hoffman et al., 2020). In the last several decades, extreme heat alone has caused more U.S. deaths than all other extreme weather events combined, making clear the ways in which social and economic inequalities intersect with and

are exacerbated by climate change, often with devastating and deadly consequences (Wong et al., 2013). Coordinated responses to climate change are increasingly acknowledged as necessary (Ballew et al., 2019), and municipalities are leading these initiatives more than state and federal policymakers. Still, much climate action planning to date has been top-down and city-wide, which overlooks the neighborhood disparities and specific needs of communities that make bottom-up, equity-driven, neighborhood-level planning crucial (Jabareen, 2015; Zen et al., 2019)—particularly towards advancing climate resilience.

The concept of *resilience* has origins in many disciplines including ecology and psychology (Holling, 1973; Masten et al., 1990). In the context of urban systems, resilience has been defined as the ability to "rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity" (Meerow et al., 2016). Community resilience is both individual and collective (Wardekker, 2021) and should scrutinize the strengths and needs of people and places. Lade et al.'s (2020) theory of resilience considers that many system views obscure the role of power relationships that affect the agency of individuals within the system (Cote & Nightingale, 2012; Olsson et al., 2015) and judges resilience by the diversity of available actions and options. The varied extent of adaptive options illustrates how and why a city's communities and its residents may experience differing (i.e., inequitable) degrees of resilience, with some more at risk than others. A city planning process that does not include perspectives and priorities from a range of neighborhoods can worsen existing inequalities by excluding people who can be advocates for their communities and help set the agenda (Elias-Trostmann et al., 2018; Ruiz- Mallén et al., 2017). Resources flow, as a result, to groups that are more politically connected and prosperous and thus are better

prepared for and will be more resilient to the risks associated with climate change (Thomas & Warner, 2019; Anguelovski et al., 2016).

A systematic review of the literature on equitable resilience (Matin et al., 2018) highlights how communities are dismissed when decisions that affect their resilience are made by external parties, and notes that the scale of governance in question is not always examined adequately. At the neighborhood scale, engaging residents that have been traditionally sidelined increases the likelihood that outcomes will be desired by community members (Oteros-Rozas et al., 2015), but the process of sustaining such outcomes in partnership with residents is less clear. Community engagement that surpasses informing and consulting to become a true partnership in strategy development has the potential to empower residents to take action in changing their communities with policymakers and ideally lead to better solutions based in local knowledge and need rather than outside assumptions (Pearce et al., 2009). Still, few studies have examined both processes and outcomes of engaging residents in climate adaptation. Thus, there is a need for research on equitable engagement strategies within cities that explore neighborhood-level approaches to climate planning, especially those that center the perspectives of frontline communities and share leadership with residents.

The present study examines the process and outcomes of Climate Safe Neighborhoods (CSN), a community-engaged, equity-driven, neighborhood-level planning process that took place in 2021 in one Cincinnati neighborhood with a long history of disinvestment. Specifically, through in-depth interviews with neighborhood residents, nonprofit organizers, and city staff, this study examines whether these collaborative efforts affected community members' perceptions of issues in their neighborhood and their likelihood to take action to address such

issues, as well as residents' and organizers' views of the barriers and catalysts to community change, including implementation of neighborhood climate resilience plans.

Cities, Climate Planning, and Community Engagement

Our future is urban. Global urbanization is steadily increasing, driven by overall population growth and an increasing ratio between urban and rural dwellers. Only 30% of the world's population lived in cities in 1950 (United Nations [UN], 2019). This percentage grew to 55% in 2022 and it is projected that 70% of the world population will be living in cities by 2050 (UN, 2023). As hubs for economic and cultural activity, cities are concentrated with people and the infrastructures of society (homes, businesses, industries, institutions, and transport systems) which comprise a built environment, all of which must coexist with a natural environment also experiencing unparalleled changes. As noted by Revi et al., (2014):

> Urban climate change-related risks are increasing (including rising sea levels and storm surges, heat stress, extreme precipitation, inland and coastal flooding, landslides, drought, increased aridity, water scarcity, and air pollution) with widespread negative impacts on people (and their health, livelihoods, and assets) and on local and national economies and ecosystems (p. 12).

The ability to prepare for climate change demands that we consider how our connections to each other and to our physical spaces interact within complex systems and affect the vulnerability of our communities. Cities worldwide are recognizing and adjusting to the environmental consequences of 150 years of a carbon-intensive economy. All urban areas share the need to develop policies and projects that improve their preparedness; what cannot be generalized are the hazards specific to their geography and the localized conditions of resources and relationships, though a commonality is apparent in the literature. Climate change adaptation,

defined by the IPCC as "the process of adjustment to actual or expected climate and its effects" in order to minimize harms (IPCC, 2014b), is increasingly characterized by participatory strategies of municipal governments in collaboration with universities, nonprofits, and individual community members (Hahn et al., 2020). It is still, however, more common for groups to theorize the importance of citizen collaboration than to provide details on the process or to evaluate outcomes (Klein et al., 2018; Wamsler, 2017).

Climate action planning that originated at the national level in the late 1990s and 2000s focused almost entirely on mitigation (reducing greenhouse gas emissions) (Agrawal, 2008; Wheeler, 2008) but over time turned increasingly to adaptation measures (Stults & Woodruff, 2017) and the city is now widely presumed to be ideal for planning approaches (Jabareen, 2015). The geographic variability of climate change impacts are experienced most concretely at the local level, so it follows that the analysis, interpretation, and methods of adaptation and mitigation be based on the specifics of the immediate environment (Measham et al., 2011; Granberg & Glover, 2021). Local governments are in closest proximity to citizens and are most directly responsible for the critical roles needed to manage resources and finances, mediate public and private actions, and deliver needed services (e.g., water, waste, energy) (Agrawal, 2008). While evidence for climate change has mounted over time, the U.S. response has been inconsistent and ranks low on the Climate Change Performance Index (CCPI) that tracks carbon dioxide emissions, renewable energy development, and energy use, despite recent targets and policies made under the Biden Administration (CCPI, 2023). The perception of insufficient national progress in climate action planning further drives local adaptation (Measham et al., 2011).

Cities face numerous barriers to climate planning including lack of access to local climate data (Carmin et al., 2013); lack of staff capacity (Bierbaum et al., 2013); inadequate specificity regarding actions, funding, implementation, timelines, monitoring, and reporting (Woodruff & Stults, 2016; Wheeler, 2008); and the time-intensive process of significantly involving the public in decision-making. Nevertheless, cities are attempting to forge ahead with climate resilience planning in diverse ways. Since resilience needs for any given area are driven by local context, there is a wide spectrum of urban resilience policy and at least 25 definitions for the concept in academic literature (Meerow et al., 2016). These definitions, put into practice by city institutions with different perspectives, are reflected in diverse policies and programs that focus on areas as varied as emergency services for natural disasters; engineering, infrastructure, and housing; land use; economic opportunities; public health; and cooperation between social service agencies. A closer look at city climate and resilience planning reveals that many approaches are not building cross-sector alliances or engaging disadvantaged communities. An analysis of resilience policies in 2019 from the 101 largest U.S. cities (Woodruff et al., 2021), found that though city government efforts to institute resilience policy is widespread, a surprising few have explicit resilience collaborations with county government (38 cities), metropolitan planning organizations (24), the business community (34), and nonprofits (43), and only 33 cities have conducted a climate change vulnerability study with 28 adaptation plans adopted. Further, social equity is not centered in the majority of plans: of 96 cities with green infrastructure programs (e.g., permeable pavement, rainwater collection, bioswales of vegetation along curbs that slow stormwater flow) only 18 (18.8%) explicitly prioritize neighborhoods with greatest need and only 14 cities (14.6%) were proactively engaging disadvantaged communities. In Raub et al.'s

(2023) analysis of climate justice within 11 coastal U.S. city resilience plans, 10 of the 11 cities engaged local communities in creating the plans but only four included vulnerable populations.

The concepts of *climate change adaptation*, *urban sustainability*, and *urban resilience* are often used synonymously as there is a great deal of overlap between the three. Fastiggi et al. (2021) conclude in their review of urban resilience plans that the different ways that each concept operates in practice remain to be dissected but that cities increasingly choose to focus on resilience by building upon previous sustainability and climate policy to "connect a variety of challenges, from climate change to structural racism" (p. 1281). In this way, resilience thinking may highlight the interconnectedness of issues in a similar way that *climate justice* serves climate change: the changing climate is a complex issue that adversely and disproportionately impacts under-resourced populations. Raub et al. (2023) noted, however, that "despite the use of the language of justice, many of the resilience plans still do not have an explicit focus on justice" (p.46), which indicates that the desire to avoid perpetuating injustices does not necessarily go hand in hand with knowing how to do so. Participatory approaches in climate planning, no longer a new concept but whose processes are still being constructed in practice, are often linked to the idea of *co-production* in which knowledge is shared and planning decisions are made jointly between government officials, scientific experts, and local people who are considered subject matter experts with their own community as subject (Ruiz-Mallén, 2020; Satorras et al., 2020). Decision-makers are learning how to partner with citizens, who contribute their experiences and preferences to help identify risks, assets, and opportunities in their communities (Van Kerkhoff & Lebel, 2015). Governance, traditionally considered the ways in which the government responds to the needs of society at local, state, and federal levels, has expanded its definition to include contributions of private and nonprofit entities that partner with public

institutions to manage public problems (Sarzynski, 2015). Collaboration between the private, public, and nonprofit sectors creates the potential for a more holistic civic capacity that respects the importance of public participation (Burton & Mustelin, 2013), though the interchangeable use of terms such as *participation*, *involvement*, and *community engagement* often obscures the actual level of the public's decision-making power (Rowe & Frewer, 2000).

One example of community engagement that embodies principles of good governance is the 2018-2019 partnership between the City of Anchorage and the University of Alaska-Anchorage (UAA). The partnership aligns with Freschi et al.'s (2023) position that climate governance should connect numerous levels of society and sectors with a plurality of actors including "practitioners, scholars, policymakers, and citizens" (p. 1). The City was the primary governmental partner in developing the Anchorage Climate Action Plan (CAP), with state and federal employees serving as members of working groups. These UAA faculty-led groups were cross-sector collaborations that drafted the plan's initial objectives with individuals from local nonprofit organizations and private businesses. The 8-month-long extensive phase of plan development that followed was open to all Anchorage residents, who were invited to co-produce further details and shaping of the plan. Through ongoing events, mobile workshops by request, and online feedback, residents helped make decisions with the intention that the CAP would reflect community goals. In all, 1300 members of the public contributed to the final product but more so than the quantity of people, it was the quality of community member participation that was noteworthy. The commitment of city officials to share with residents the power to decide on how to protect their shared environment from climate change addressed the gap in literature on equitable engagement strategies on many levels (Hahn et al., 2020), even if the plan did not specifically outline individual needs of each neighborhood. In contrast to locations that struggle

to engage with the topic of climate change due to a perceived lack of relevance to one's own life, Alaska has warmed twice as fast as mainland U.S. in the last 50 years and the impacts are readily apparent (Reidmiller et al., 2017). Less apparent are the Anchorage residents' perspectives on the participatory planning process and how they judge any of its community effects. In this way, voices that can contribute to a larger understanding of equity-based procedures are still often missing in climate planning studies. After the Anchorage Assembly passed the plan in June 2019, post hoc groups were formed to monitor implementation and to continue strengthening community buy-in but momentum was interrupted by the election of a less enthusiastic mayor and progress stalled (M. Hahn, personal communication, February 13, 2023). Results of climate planning in communities take time to develop in the best of circumstances but the shift in Anchorage's political leadership limited the possibility of showing that local participation led to exceptional results. CAP organizers hope that the original positivity with which their engagement process was received will induce renewed support for the plan when the political pendulum swings back to an administration interested in equity and climate resilience (C. Kemp, personal communication, February 24, 2023).

Studies that center equity using participatory processes have been rare, though the pace of publication has picked up in recent years (Jagannathan et al., 2020). Approaches that explicitly aim to engage a diverse representation of community members beyond the usual, expected attendees of meetings—those with the time, resources, and energy to regularly do so—include Community Based Participatory Research (CBPR) and Participatory Action Research (PAR) (Ruiz-Mallén, 2020; Vaughn & Jacquez, 2020). Meaningful collaboration that centers procedural and distributive equity is theorized to be the path to transforming communities through radical changes that alter systems, consider power relationships, and address root causes (Pelling et al.,

2015). Jagannathan et al.'s (2020) review of adaptation case studies that use co-production methods found more evidence thus far of knowledge production, dialogue, and capacity building than extended change (p. 23) which suggests that the complex goal of transformation is in its early stages and equity's non-linear path includes incremental change as part of the process. Procedural equity in climate resilience planning requires that participants are treated equally and fairly throughout the engagement process and members of communities disproportionately affected by climate change are represented (Yuen et al., 2017). Distributional equity calls for the fair distribution of resources and benefits of programs and policies, and outcomes that strengthen the assets of vulnerable groups (Malloy & Ashcraft, 2020). When cities reject top-down planning that caters to wealthy interests and reinforces existing inequalities, groups not traditionally included in decisions receive due respect for knowledge of place and ability to contribute. Further, more opportunity is created to achieve the types of ambitious transformative outcomes that are sought: those that challenge norms, restructure systems, and are long-lasting rather than fleeting (Fedele et al., 2019). The fact that studies that investigate the effects of the equitable engagement experience on participants is even less common than the engagement itself indicates an area of need that psychology can serve.

Psychology of Equitable Engagement and Climate Change

The need to explore the processes and impacts of equitable engagement with community members is urgent. Freschi et al.'s (2023) systematic review contends that the psychological research on climate planning is based mostly on individual short-term acts of adaptation and mitigation with very little focus on collective, political, and context-specific processes. More case study research on psychosocial processes between people in groups is needed (Tam et al., 2021; Chapman et al., 2018), "where patterns of collaboration/experimentation with citizens

could promote preparedness and adaptive capacity in the population, for example, by co-designing climate change action plans at the local level" (p. 3). Lower-income urban communities are all too often located in areas exposed to environmental risks such as water and air pollution from treatment plants, refineries, or landfills (Fowlie et al., 2020; Meyer et al., 2018; Mohai et al., 2009), where housing is substandard after years of disinvestment, and where pavement and lack of trees contribute to higher levels of heat. Residents in such neighborhoods are more likely to have preexisting health conditions and less likely to have financial safety nets to offset the fallout from climate change consequences such as localized flooding or extreme heat and the resulting housing damage and increased health care costs (Fiack et al., 2021; Yuen et al., 2017). In Cincinnati, where average annual temperatures are rising, higher heat days lead to higher rates of asthma and heat stroke. Shorter winters result in more ticks, mosquitos, and increased spread of diseases typically found in more southern locations. Air quality deteriorates as heat waves cause more pollutants like ground-level ozone and fine particles that increase the danger of heart attacks and deep vein clots (U.S. Global Change Research Program, 2018a). Increased major storms cause damage like sewer backups, flash flooding (U.S. EPA, 2016), and landslides that threaten hillside instability as they did in 2019, when $17 million was spent to stabilize a roadway over two years (City of Cincinnati, 2021). Flooded basements and buildings can cause mold to grow, while also transporting bacteria, viruses, and parasites (Hoppe et al., 2012; U.S. EPA, 2023). Given that not all areas in Cincinnati are experiencing the same degree of impact (Even et al., 2021), it is necessary to understand and alleviate those increased risks in vulnerable communities at the neighborhood level.

Vulnerability, defined by the IPCC as a system's exposure and level of sensitivity to climate impacts and its existing capacity to moderate them (IPCC, 2021), is appropriately

assessed where impacts manifest and solutions can be informed by the concerns and priorities of those who live there. Further, the individual and collective resilience of people and communities is strengthened by the social cohesion that results from fostering social networks, a sense of community identity, and decreasing isolation (Elias-Trostmann et al., 2018). Individuals who are struggling financially, however, perhaps working multiple low-wage jobs, may not prioritize action on climate change when compared to insistent, daily concerns unless climate change's connections to those daily stressors are made explicit. Such connections may be forged through engagement that is rewarding intrinsically (e.g., personal values, empowerment, sense of community) and/or extrinsically (e.g., participants are compensated for their involvement). Individual disconnection to climate change is also due to the politicization of the climate crisis and failure to attribute local weather-related hazards to wider climate change (Change, 2016; Goebbert et al., 2012), both of which relate to the different ways that people frame information and experiences (Goffman, 1974). Individuals mentally identify and organize the world around them through the act of framing, described by Nisbet (2009) as "interpretive storylines", and in doing so, construct their understanding of reality—a process that is, for the most part, unconscious. Framing is so automatic and rooted in personal experience and sense of self that it does not usually register as a bias, a blind spot, a heuristic that underestimates the risks of climate change, or an interpretation shaped by one's political or cultural ideology (Kahneman et al., 1983; Moser & Ekstrom, 2010). There is a need for climate communication to engage more broadly with the public and policymakers by intentionally emphasizing different aspects of the issue (i.e., conscious framing) that tailor the message to a wider range of values and worldviews. Opinions on climate change may serve more as a driver and less as a barrier to the process of climate planning if individuals respond to the topic as, for example, a moral issue, environmental

issue, health issue, or economic issue (Lieberknecht, 2022), all concepts that the literature on the psychology of climate communication is attending to (Gustafson et al., 2019; Nabi et al., 2018; Leiserowitz et al., 2019; Kahan, 2014). Social psychology has delved into motivational factors that influence individual worldviews and perceptions of climate change (O'Brien & Sygna, 2013; Wamsler & Osberg, 2022; Whitmarsh & Capstick, 2018) and why knowledge of severe climate change effects is not enough for many people to take action (Gifford, 2011).

Though formal assessments of the participation processes have been lacking (Burton & Mustelin, 2013; Grothmann & Michel, 2021; Hügel & Davies, 2020; Sarzynski, 2015), as well as research on the barriers to and catalysts of plan implementation (Hahn et al., 2020), better results are widely assumed to result from engagement at the local scale. Evidence must be presented, however, to demonstrate that to be the case—a challenge for climate resilience planners given that adaptation policies and strategies are arguably too young for immediate evaluation of significance (Baker et al., 2012; Vogel & Henstra, 2015). In the meantime, as outcomes in the community mature to allow for substantial assessment over time, and the methods by which to do so are determined, psychologists are equipped to contribute more to the study of how participation in the process affects people by investigating impacts on individual perceptions and actions, context-specific group processes, and the mechanisms of change that occur during climate planning. Understanding how these processes affect people from diverse demographics such as age may also assist in developing other programs that target equitable resilience and community engagement.

The Present Study

The present study represents a step toward addressing key gaps in the literature on equitable resilience in urban climate planning by examining the process and results of Climate

Safe Neighborhoods (CSN), a program for community-engaged, equity-driven, neighborhood-level planning that took place in Cincinnati in 2021. Specifically, through in-depth interviews with residents and organizers involved in CSN, this study examined how participating in CSN affected residents' perceptions and actions as well as how residents and organizers viewed CSN-driven change processes in Cincinnati. In doing so, this study begins to fill important gaps in the literature including: resident voices in the adaptation literature (Wamsler, 2017); empirical case studies that analyze the processes and results of community-engaged climate planning, and their contributions to both theoretical knowledge and practical implementation (Akompab, 2013; Brink & Wamsler, 2019; Hegger et al., 2017); equitable resilience and the integration of social equity concerns into local-level climate planning (Fiack et al., 2021; Matin et al., 2018; Owen, 2020; Shi et al., 2016; Yuen et al., 2017); and barriers to and catalysts of plan implementation (Hahn et al., 2020).

The present study addresses the following three research questions:

1. How did CSN impact residents' perceptions of issues in their community?
2. How did CSN affect the potential that community members take action to address issues?
3. How do CSN residents and organizers describe barriers and catalysts to community change?

Method

Community Partnership and Research Context

CSN is an initiative that national nonprofit Groundwork USA has launched in fifteen cities across the country (Groundwork USA, 2023). These cities include Cincinnati, led by Groundwork Ohio River Valley (ORV) (Groundwork ORV, 2023) with the purpose of organizing and mobilizing residents and community stakeholders to make neighborhoods more

resilient to extreme heat and flooding. In the initial phase of CSN in 2021, Groundwork ORV and the regional sustainability organization Green Umbrella partnered with residents of the Lower Price Hill (LPH) neighborhood to hold a series of six Climate Action Group (CAG) meetings. Over the course of 10 weeks, residents explored the intersections of history, housing, and climate change: namely that through much of the 1900s, at minimum until the Fair Housing Act of 1968 was passed (Community Building Institute [CBI], 2019), Cincinnatians were subject to discriminatory housing practices by the Cincinnati Real Estate Board and lenders who favored White community members for home ownership in specific neighborhoods deemed more desirable (Horn, 2022). The result was many segregated neighborhoods that declined economically over time and became less resilient and more vulnerable to the effects of climate change in the Ohio River Valley. At the end of the program period in April 2021, the residents produced a neighborhood resilience plan that was adopted by the LPH Community Council as an official city document and informed city leaders during the rewriting of the Green Cincinnati Plan for 2023, the city's central climate planning document.

Table 1.
Program overview: Climate Safe Neighborhoods (CSN) Climate Action Group (CAG) - Lower Price Hill

Topic	Meeting	Focus
Introduction	1	Overview Definitions: resilient, vulnerable, equitable
LPH context & priorities	2	Neighborhood history Environmental harms Current strengths and assets Homework: neighbor survey
Climate change vulnerabilities	3	Climate change causes and impacts: global, national, Cincinnati, LPH Homework: find programs that provide environmental resources to LPH community
Mitigation strategies	4	Implementation options; programs by City, Groundwork ORV, and Green Umbrella

		Mark implementation locations on LPH map
Avenues of change	5	Presentations by local organizations Mark implementation locations on LPH map Homework: reflect on CAG process and Green Cincinnati Plan
LPH resilience plan synthesis	6	Map of neighborhood resilience plan CAG evaluation with residents Future of CSN and Green Cincinnati Plan

The partners that produced the pilot CAG meetings in Cincinnati made LPH Ohio's first CSN. Groundwork ORV, Green Umbrella, and the City of Cincinnati Office of Environment & Sustainability worked together to create content and plan logistics, and acted in various capacities as facilitators, notetakers, and active participants in meetings. The Office of Environment & Sustainability publishes the Green Cincinnati Plan, a set of citywide sustainability and resilience recommendations that has since been updated in 2023, and through their involvement in the LPH CAG the city representatives aimed to strengthen the local climate planning process by hearing directly from residents about problems (how climate impacts show up in the LPH neighborhood), solutions (the resulting neighborhood resilience map outlining adaptation strategies chosen by residents), and to share information with residents that will enable them to advocate for resources. Two individuals from Groundwork ORV and Green Umbrella shared the role of co-facilitator, while Groundwork ORV took the lead in recruitment as the organization is located in LPH and has an established network of local relationships. Recruitment was achieved by social media, posting flyers, and word of mouth with efforts made to recruit residents under the age of 18. Part of Groundwork ORV's mission to improve the physical environment by developing community-based partnerships that empower people is accomplished through their Green Team program, which develops high school students for jobs such as natural resource management and urban agriculture. Many Green Team members are

racial minorities from low-income families, which aligns with Groundwork ORV's goal to undo legacies of poverty and racial discrimination. CAG members were recruited for six meetings and were paid $100 per two-hour meeting (plus interim homework) to demonstrate Groundwork ORV's commitment to financial compensation as an equitable practice that respects people's time and input.

LPH is a small neighborhood west of downtown Cincinnati that is bordered to the south by U.S. 50, a highway that runs along the Ohio River. To the east is Mill Creek, a waterway that was used for many years to dispose of industrial waste, though it is significantly cleaner today than when it was named the most endangered urban stream in North America (Mill Creek Alliance, 2023). A steep hill rises sharply on the western edge of the neighborhood; until 2019, when a segment of the narrow, wooded road traversing the steep hillside was reopened after being closed in the late 1980s, LPH residents were only able to access resources at the top of the hill such as groceries and the library by using high-trafficked, high-speed, high-polluted arteries. Also adjacent to LPH is the CSX Queensgate Yard, the largest active railyard in the country (T.Y. Lin International, 2020). Among the reasons that LPH was chosen as the initial CSN for residents to discuss the community's history and current climate concerns is its identification as an environmental justice community. LPH is home to the region's largest wastewater treatment plant and surrounded by industrial neighbors that include concrete production facilities, steel fabricators, and chemical manufacturers, with a tree canopy of 20.6% (City of Cincinnati, 2023). The community suffers from disproportionate cancer and asthmas rates, upper respiratory ailments, seizures, learning disabilities, lead poisoning, and ear problems related to sinus infections (Groundwork ORV, 2023). The racial makeup of the neighborhood has fluctuated over the years with varying rates of Black residents, immigrants, and influxes of White migrants from

Appalachia; current demographics for LPH/Queensgate are approximately 48% Black/African American, 41% White, and 6% Hispanic/Latino (U.S. Census, 2020a). Over 66% of family household incomes are below the poverty level with a median household income of $15,987 (U.S. Census, 2020b).

University of Cincinnati researchers joined the CSN planning team shortly after the LPH meetings ended in the capacity to: (1) contribute university funding that enabled the CSN community partners to complete a second iteration of meetings in another neighborhood; and (2) lead the examination of lessons learned from the LPH pilot process. This study was funded by the Community Change Collaborative (C3) at the University of Cincinnati.

Participants

Fourteen interviews were conducted with members of the LPH CAG, six with residents and eight with organizers. Of the six residents, all were women/female with an age range of 15-48, including a second adolescent aged 16, and an average age of 32 years. Four of the six were Black/African American (66.6%), one was White (16.7%) and one was Hispanic/Latino (16.7%). Half of the group had attended, or currently was attending, high school between 9^{th}-12^{th} grade but had not received a diploma (50%); two members had attended some college or university but had not earned a degree (33.3%); and one had earned an associate degree (16.7%). One had lived in the neighborhood for between 1-5 years (16.7%), one between 5-10 years (16.7%), one between 10-15 years (16.7%), and one for more than 20 years (16.7%). Two (33.3%) lived in a different community but worked in LPH and one was a former resident of between 5-10 years. Half of the group was employed and working 21-40 hours weekly (50%), two were not employed and looking for work (33.3%), and one was employed and working 40 or more hours per week (16.7%). Two participants lived in their family/childhood home (33.3%), two rented

their homes (33.3%), one was a homeowner (16.7%), and one did not answer (16.7%). The CAG began in February of 2021 with 11 participating residents and had an attrition rate of 45.5%, ending ten weeks later in April 2021 with six participants. Efforts were made to reach the participants who left the program with the intention to ask about the factors that led to their departure; while these participants were unable to be reached, the organizers shared their limited knowledge about why those who left did so.

Of the eight organizers, four were women/female (50%), three were men/male (37.5%), and one person (12.5%) identified as both woman/female and gender non-conforming. Organizers ranged in age from between 22-40 with an average age of 32 years. Three of the eight were Black/African American (37.5%), three were White (37.5%), one was Hispanic/Latino (12.5%), and one was Native Hawaiian/Pacific Islander (12.5%). Three organizers held a bachelor's degree (37.5%) and the remaining five had completed a graduate or professional degree (62.5%). Three of the organizers (37.5%) worked in the neighborhood but none were residents. Three organizers represented the City (37.5%) and five were nonprofit representatives (62.5%).

Data Collection

The data consisted of audio-recorded interviews (conducted by the author) that took place virtually via Zoom in July and August 2021. The interviews explored the reasons that participants became involved with the CSN project, sought their feedback on the process of convening the pilot neighborhood group, gauged their individual levels of engagement that resulted from participation in the CAG meetings, and assessed the likelihood of future neighborhood advocacy. Two separate interview protocols were developed for members and organizers, though the questions for both groups were similar, with substantial overlap, and

interview sections for both were structured with the following headings: Part 1. The Story of your Involvement (e.g., "How did you get involved in Climate Safe Neighborhoods?"); Part 2. Process (e.g., "If we could start the CAG all over again, what would you change about it?"); Part 3. Equity (e.g., "To what extent do you feel that you were able to articulate your priorities for your neighborhood? Do you feel your voice was heard?"); Part 4. Impact and Outcomes (e.g., "Did the CAG experience impact your sense of connection to your community?"); and Part 5. Next Steps and Community Toolkit (e.g., "What do you see as the next steps toward enacting the climate resilience plan?") (see Appendices A and B). Overall the 14 recorded sessions totaled 9.3 hours of audio with an average interview length of 40 minutes.

Data Analysis

The data consists of the audio interviews that were transcribed verbatim and analyzed using the method of thematic analysis (Braun & Clarke, 2006). A coding team of three researchers—one graduate student and two undergraduates who were members of the Collaborative Sustainability Lab at the University of Cincinnati—began by discussing the research questions and then practiced coding an extract of the first transcript together to develop the group's understanding and confidence in the coding process. Over eight weeks between October and December of 2021, the group members independently read each script and took notes on the ideas, thoughts, and feelings of each participant. The team met on a weekly basis to discuss and combine their notes, one transcript at a time, slowly amassing a list of words and phrases that relate to (1) resident perceptions; (2) resident actions; and (3) barriers and catalysts to resilience plan implementation. The notes were both semantic, surface-level, observations and more interpretive, or latent, in their approach and thus aimed to capture both what the group members said and what the researchers believed to be the assumptions and deeper meanings

beneath that which was explicitly stated (Braun & Clarke, 2006). Recurring ideas and concepts in the data were considered potentially significant and continued to be examined as the dataset evolved. Potential codes were identified, organized, and re-organized in an attempt to actively identify themes and central organizing concepts from this shapeshifting list. A theoretical assumption underlying this process was that of the constructionist perspective: meaning generated is not an individual experience. The motivations and thought processes of the program participants were situated in a societal and structural context, as were those of the researchers conducting the thematic analysis, and the two (participants and researchers) interact (Braun & Clarke, 2006). Language and communication are complex and coded, in the colloquial sense that the words one chooses and the way those words are used appeals to and are understood by different individuals in different ways. Meaning, therefore, depends on who is talking and who is reading or listening, and this meaningfulness was the main influence in the development of codes and themes (Byrne, 2022).

Finally, the research questions for this study called for a largely experiential orientation towards understanding the data. Seeking to understand how the participants perceived and intended to act in relation to neighborhood issues "requires an appreciation that the thoughts, feelings, and experiences of participants are a reflection of personal states held internally by the participant" (Byrne, 2022, p. 1396). A more critical perspective that examines the social construction of the research topic is present when the study's narrative acknowledges the effects that racist housing practices have had on the community in the present-day. This study context, however, is not foregrounded in the research questions themselves. The questions focus on subjective personal states and personal views on barriers and catalysts contributing to change and thus retain an experiential orientation. The coding process and final analysis resulted in

generating a list of themes and sub-themes defined narratively to capture the stories of CAG residents and organizers in relation to each research question.

Results

Findings are framed into three sections that correspond to the study's three research questions, with each section further defined by major themes, sub-themes, and quotes. Comparisons will be made between different participant groups when applicable (e.g., residents-organizers and youth-adults), to explore the influence of varying roles and generational dimensions that may occur within a diverse group of participants. In all cases, participants are identified by pseudonyms.

Resident Perceptions of Community Issues

The study's first research question explores how the CAG impacted the residents' perceptions of issues within their community, that is, how their grasp or interpretation of community issues may have been affected. Two major themes were found during analysis: (1) Understanding of issues, including how connected the issues are to each other; and (2) Personalization of issues.

Understanding of Issues

Participation in the CAG exposed the residents to a large amount of new information about their neighborhood. Residents learned about environmental issues that may have been previously noticeable without being understood, such as why their neighborhood seems hotter than surrounding communities and why it is more prone to flooding, above and beyond its location as a low-lying community at the confluence of the Mill Creek and the Ohio River. Kesha said, "I didn't know we was a hot…spot because of the buildings that we have down here, and they gave me an explanation why. I don't go outside, because when I go outside, I feel

smothered." Residents learned that less tree canopy and more impervious surfaces (e.g., asphalt and concrete) equals less vegetation and root systems to absorb precipitation. Morgan, one of the two adolescents in the group, noted that after hard rains the neighborhood smells like sewage because "Mill Creek in Lower Price Hill… connects to the sewers…And I think it was the rain overflow and there's not enough trees in the community to soak up all the rainwater." Heavy rainfall leads to raw sewage in local waterways because Cincinnati's combined storm-sewer system was not engineered to handle the high volumes of water dumped in today's storms. When the capacity of the old pipes is breached, stormwater and sewage overflows into the Mill Creek that borders LPH to the east Cincinnati (Metropolitan Sewer District, 2022), continuing its legacy as a recipient of harmful contaminants (Mill Creek Alliance, 2023).

Both youth and adult group members expressed surprise upon learning that their neighborhood ranks among the highest citywide for lifetime cancer risk from inhalation of carcinogenic air pollutants (U.S. EPA, 2014; Even et al., 2021), and that the toxicity of airborne ozone and particulate matter in bodies may be exacerbated by heat stress (Gordon, C. J. et al., 2011). Faith, one of the youth participants, "didn't know about those health risks...that our air isn't as good as some other neighborhoods because of businesses and stuff that creates bad air..." The extent to which nearby heavy industry has polluted their air and water supply over the years (Hamilton County Regional Planning Commission, 2004) affected Jo Ann, a small business owner who was active in multiple neighborhood projects including the CAG,

> Recognizing and learning about how politics play a part in our well-being was the most impactful, but also the most disheartening…For example, companies being able to pollute communities. That was shocking and hurtful to hear…that really stood out in how different communities are targeted.

Morgan and Faith both noted ways in which their understanding of environmental issues expanded past the scientific facts learned in school towards a more nuanced appreciation of how environmental conditions of their community contributes to current and future climate threats, economic opportunities, and overall human wellbeing. 16-year-old Morgan developed a greater appreciation of the role of trees in mitigating the effects of excessive heat and water.

> 'Cause usually as a kid [I thought] like, "Well, trees make paper, and they suck up the carbon dioxide, and they produce oxygen." But with these meetings, it shows how much I really, and like personally, need trees around my community, or around my home, or just anywhere I'm at to prevent myself from being overheated or dealing with floods.

Faith, who lived in LPH when she was younger before moving with her family to a nearby neighborhood with more trees, yards, and parks, grasped the overall trends and differences between LPH and other Cincinnati communities when she was shown maps that illustrate the patterns of heat distribution across the city.

> I saw the big picture of it when I was looking at the maps, and how a lot of [Lower Price Hill] stores have been closed down in the last few years, and how we barely have anything for our community down there for them to go buy some clothes or go buy shoes or go get a job, it’s harder for them to do that down there because we don’t have many opportunities.

Increased greenspace is recognizably associated with lower ambient temperatures, a difference that has been measured as high as 12□F in Cincinnati (CAPA Strategies, 2020). Some of the city’s 52 neighborhoods will experience the impact of rising heat more than others and neighborhoods with cooler temperatures tend to be wealthier, with stronger microeconomies of local businesses (Groundwork ORV, 2023). Faith worked in LPH after school and thus spent a

lot of her time in her former neighborhood. She found it revelatory to visualize the relationship between local neighborhood resources, temperature discrepancies, and air quality differences that she regularly experiences when traveling between work and home.

> To know when I go to work, I have to be in a worser environment…just because society...it's just bigger problems. That was really interesting and shocking to me to learn about at 15, it just opened my eyes to some things.

In addition to its being "really mind-blowing to see all these actually important things that I just didn't know about, and I know so many other people just don't know about," she anticipated that the knowledge would serve her in the future when she hopes to have more standing and influence and said that "it was good to learn…so I could share that information one day, maybe when I'm a pillar in the community." Faith said that she initially did not understand some of the environmental topics but as she got into the meetings, "it all started to make sense in my head…I started to get the gist of it, and it just started to become like…The words didn't seem so big in my head anymore."

Adult residents reiterated the value of discussions that delved into how climate issues relate to justice and inequality. Long-time resident Elenore gave the feedback that "I've known about climate change, but I never really knew the subtext…and the depth of it." She considered the community issues in the context of COVID and people who were then arguing about whether or not to vaccinate. She said, "it's not gonna mean anything, vaccinated or unvaccinated, if we can't breathe the air or drink the water or eat the food." Jo Ann felt most impacted by the perspective of climate change's connection to so many other things and recognizing,

> How deeply rooted things are and how there is no easy solution. Once you try to resolve one issue, you see all these other issues that pop up…you start to see that pattern in

> everything; not just the environment, but in life in general. When you're an advocate for humanity, you start to see how everything is so much bigger than it seems. It's no easy answer.

She noted that messaging she's received about the environment typically remains at a less complicated surface level, "We hear about recycling but there's not a lot of conversations dealing with deeper issues and how everything is connected to the environment. So I definitely think that it helped me see things a little different." Jo Ann was involved in a lot of different projects but always tried to find common roots between seemingly separate issues. She said that the CAG gave her more confirmation that, "I'm over here doing these things, but I'm hearing the same issues over here, even dealing with the environment." Gaby, a young mother who grew up in LPH, said that prior to joining the CAG her thoughts on climate change stopped at "Reduce, Reuse, Recycle", but that the city maps that compared LPH to neighborhoods citywide (e.g., with color-coded data for % tree canopy, impervious surfaces, and air toxins cancer risk) allowed the residents to make more informed judgments about their neighborhood.

> Usually [people] just say, "Oh, Lower Price Hill is bad, it's so bad", but there was actually facts to back it up. Even with all of our improvements, compared to the rest of the city or the rest of the state of Ohio we still have a long way to go.

And yet, one of the CAG members' homework exercises, a survey of 5-10 of their neighbors, demonstrated the affection that many residents feel for LPH. In response to questions such as *What are your three biggest issues in Lower Price Hill? Do you know about the Lower Price Hill Resurgency Plan?* (Community Learning Center Institute [CLCI], 2019) and *Would you like to stay informed on climate work going on in Lower Price Hill?* Gaby reported that

"most of the answers were positive, so that's what we like to see, 'cause Lower Price Hill is not all bad."

Personalization of Issues

Being involved in CAG meetings helped residents to personalize issues, that is, to make associations between larger contexts and local climate impacts. Personalization acknowledges the ways in which events in the community's history have affected its present conditions and offers individuals an understanding of how their own lives (e.g., their life expectancy or health outcomes) may be affected. Elenore reflected on 1925 zoning that favored the proliferation of industry and reduced the development of housing and recreation sites in LPH (The City Planning Commission Cincinnati, 1925), alongside the fact that LPH today is home to the Metropolitan Sewer District, Cincinnati's largest sewage processing site. She linked the community's past to today's air and water pollution and the struggle to keep her apartment cool in an environment with more pavement than trees.

> You can smell the heat... It gets so hot; you can smell the humidity. It's horrible, actually, at the end of Mill Creek... I can't even open my windows because there's some days it just smells like... It smells really terrible outside. And I want the fresh air to come in, but I don't wanna be scrubbing that stink out of my wall for the next week.

Kesha noted that she started buying bottled water when she learned more about local waterways and has become more careful about protecting herself from the heat by choosing to "walk outside and be out before the peak of it, and don't go back until the peak go down." Current zoning maps showed residents that manufacturing was still by far the City's prevalent interest in the neighborhood (CLCI, 2019, pp. 11-12) and allowed Elenore to visualize how the lack of shade and prioritization of industry over time had shaped her immediate surroundings.

> I gotta walk up the street there and there ain't hardly no tree. I damn near burn to death trying to walk up the street, which I try to avoid, which cost me more money, but I'd rather get in the air-conditioned Lyft, than to walk up the street to get on a bus, which would be cheaper…I'm gonna have sun stroke walking up the dang burned street.

When a member of the local NAACP's Environmental Climate Justice Committee shared details about EPA-regulated facilities in LPH—some businesses had been cited and fined for pollution (Yancey, 2016) but most were operating within boundaries that were considered acceptable despite wide health disparities between industrial and non-industrial communities (Even et al., 2021)—Morgan sensed that many of her neighbors didn't know the extent of air pollution they consumed. She said that "companies around Lower Price Hill [are] doing things that affect the community, which the community really don't have an input in." Kesha's reaction to learning that high levels of pollution in LPH are sanctioned by the government was to ask, "What do you mean they're allowed to do that?" She said that it was eye-opening to the point "where it was like, can you trust your city?" Elenore became more worried about climate change and felt an urgency to protect her family because she didn't want "[her] grandchildren to have to walk around with gas masks on. I don't wanna have to walk outside and gotta worry…" She thought more about when she is gone but "my kids gotta still be here and their kids gotta still be here. And I don't want them in a world where they can't live or go outside."

> I didn't know companies were allowed to emit so much pollution into the air, I didn't know that. And I'm like, "Well, that's weird." We know pollution damages the earth, so you gonna allow them to produce so much pollution? Who controls it?

Sonja, an organizer who works closely with LPH residents as part of her full-time job, noted that there was "one member who...after the second meeting, which was all about redlining

and the racist history of Cincinnati, wanted to leave, just because of how negative and harsh that meeting was." As discomfiting as it was to learn of neighborhood and citywide disparities such as the wide racial margin of 73% White and 33% Black homeownership in Cincinnati (CBI, 2019; Housing Opportunities Made Equal of Greater Cincinnati, 2022), the resident ultimately decided to stay in the program after talking through her unease with Sonja. Overall, as residents put the historical and contemporary pieces together on how housing, urban planning, pollution, pavement, and prejudice affect people and places, they appreciated knowing how their community's past links to the present and future. Gaby, a rare homeowner in a neighborhood where almost 84% of housing is occupied by renters ("A statistical tour," 2022) said, "I never knew about the cancer in the neighborhood, that living down here is a greater risk," and because of her daughter she wants to "make the world a better place for her generation." Jo Ann said that joining the CAG enabled her to "connect with other people and the power is in hearing the voices of your neighbors, they're saying, 'Hey, I'm having health issues, or so-and-so died in my family because of this." She asked what better way to learn "than through the voices of those who have been in the community through generations." 15-year-old Faith explained the past, present, and future in this way,

> The balance we have [with discussing the history of the neighborhood] is really good for making a plan for the future. Because it shows you like, "Oh, this was the past, but how can we make it better, but also not repeating the past?" ...We gotta make sure we're doing better.

An alternate viewpoint expressed by an organizer displayed less ease with the extent to which historical motivations for past actions are interpreted by today's standards and inequities.

Darrell's sense was that the climate community is trying to figure out how to acknowledge the past without getting stuck in anger while also focusing on future solutions.

> One of the big themes I feel like we're all wrestling with…is environmental justice versus environmental equity. And I feel like the justice framing focuses more on history and how we got to where we are, and equity focuses more on how we address…where we go from here…it's so easy to point to all the problems without starting to talk about the solutions. [CSN] does feel like a real step towards talking about solutions, which I appreciate…I think the justice approach gets more of an emotional reaction…whereas the equity approach is very much focused on, "Okay, now what are we gonna do about it? How do we design a program to fix this?"

Kesha, who had attended but not graduated from high school, was looking for work at the time of the CAG and eventually landed several jobs in community service roles. She expressed equal amounts of dissatisfaction and defiance regarding LPH's diminished life expectancy when compared to wealthy areas like the Hyde Park neighborhood where life expectancy is 83.9 years (Even et al., 2021), "We only live to 65 over here. And I'm like, 'Something gotta change about that, 'cause I plan on seeing 80.'" In fact, the gap between neighborhood life expectancies was larger than Kesha realized. According to the Cincinnati Climate Equity Indicators Report completed in summer 2021, a few months after the CAG meetings ended, LPH/Queensgate ranked lowest in the city at 62.9 years while residents of Mt. Adams, a hill directly east of downtown, lived on average to the age of 87.8 (Even et al., 2021), a difference of almost 25 years between areas only 5 miles apart.

Through CAG participation, residents learned about the climate vulnerabilities faced by LPH and began to perceive how those issues are social and political in addition to environmental.

The residents gained an understanding of how the history of their community is related to the severity of local climate change impacts through a threefold process that involved identifying, describing, and explaining the issues: *what they are, how they are, and why they are*. They gained a deeper awareness of the ways in which problems are profoundly connected, not just to each other but to themselves, by recognizing when their own lives were personally affected by factors such as heat, cancer risk, homeownership, and life expectancy.

Residents' Potential to Act

The second research question examines whether the CAG affected the potential of the residents to take action to address issues within their communities. Two themes were found to increase the likelihood that residents would externalize their knowledge by advocating for themselves and their community: (1) Personal connection to climate topics; and (2) Building equitable relationships (with neighbors, members of community organizations, and government representatives).

Personal Connection

Residents were more likely to act on environmental issues within the community if they felt personally connected to climate change and climate justice, especially in the context of their families and neighbors, and they reported on whether and how they expected their behaviors to change.

Gaby served in a separate volunteer civic role on behalf of LPH at the time that she joined the CSN group. Despite her occasional frustration during CAG meetings when residents veered off topic or talked over others until reminded of conversation norms by the facilitators, she felt an ongoing desire to know more and do more, "It was a commitment that I actually liked, regardless of if I got paid for it or not. I still want to learn more about climate change and how I

can help, besides just coming to a meeting." Faith worked for Groundwork ORV's Green Team, in addition to participating in the CAG. Faith stressed that *the how* was "really good to learn…what can you actually do to make it better is what we were taught," and used the example of learning the ways that one person can save water. She said the group drove her to continue learning about environmental topics.

> The [CAG] was a big part of why I wanted to learn more about environment…I did the Winter Green Team because the [CAG] got me thinking about how our community is not as good as it could be and how it could be better...the [CAG] and Groundwork just really inspired me to learn more about it and maybe not even just with Groundwork…just on my own, just learn more about it and keep myself...Well, I keep myself knowing.

Elenore, who had lived in LPH for 11 years and whose children had participated in a community gardening project, joined several climate-focused online groups after the CAG meetings ended, "just to see across the globe, what other people are dealing with in other countries…what their politicians are doing, ideas that maybe we could implement." She struggled with her sometimes negative view of politicians but was inspired to gather ideas from distant sources and had become committed to and confident about serving as a local source of information for her LPH neighbors. Elenore said that "communication is always the best combat to stagnation" and saw herself as an informal conduit of communication to challenge the preconceived notions of friends, family, and neighbors and open their minds to the value of preparing for the effects of climate change.

> I thoroughly enjoyed learning more about it and knowing that there's something I can do. It's not all lost. A lot of people hear climate change, they be like, "Well, there's nothing I can do about it. What's going on? What's going on? I can't do nothing about it." But yeah,

> you can. And that's been my contribution to the conversation. "Oh, but you can." Let me tell you what I learned and get the word out that way.

Elenore shared her perspective that the CAG highlighted the need for community education on neighborhood vulnerabilities to climate change in tandem with information about response strategies. She appreciated that the CAG illuminated the path between climate causes and effects and gave participants reasons and ideas on how to intervene since too often, “People don't think it's real because they haven't actually seen it. We’re in a society that if we can't touch it, smell it, or see it, we feel like we can't... It's not there or it doesn't exist.” When asked if she wants to be part of future action to implement the neighborhood resilience plan created by the residents Elenore said,

> I wanna be part of it just because I’m invested now, not just intellectually but emotionally…whatever I can do to aid it, whether it be going out into the neighborhood or going out in the other neighborhoods and speaking…I can’t get out there and do no physical work, but I can definitely…spread the word.

Faith added,

> The immediate impact was getting more people in the community thinking about problems that we have, and thinking about how we can, us ourselves personally, can help fix those problems, and how we can get other people in the community to help fix those problems with us.

The growing capacity of the residents to act in service for LPH, based on the knowledge that they gained from the CAG, was reflected in their desire to continue learning about environmental issues and to take on larger roles as communicators who share information with

their neighbors about how their community is being impacted by climate change and what they can do in response.

Building Equitable Relationships

Community members who felt that they were building genuine relationships with other residents, with representatives of local organizations, and with representatives of the city government were motivated to act on neighborhood issues. Equitable relationships were described by residents as those in which they bring equal value to interactions. The organizers were praised for their inclusive approach and commitment to listen to the residents, described by Kesha as, "they made sure…to hear from us and it wasn't their ideas coming out of our mouths…it was what *we* wanted for our community." Kesha said of the CAG,

> It just made me wanna speak for [LPH] more. 'Cause knowing the talk…we're not supposed to be educated at all. That's what the talk of the town is…and I'm the one to let you know, "Yes, I went to a Cincinnati public school. And yes, I do know how to talk."

Morgan characterized the organizers' methods of sharing information, asking and accepting questions, and giving feedback as "teaching the group and also getting taught by the group." She said that the group discussions were helpful in that it was good to learn "what people can do to change…and who people can speak to about the things like this…[we] were given information to do certain things and act on them, instead of sitting back there and feeling useless." Luca, a nonprofit organizer in the community who also works closely with the city representatives, depicted the CAG's equitable approach to power dynamics as one in which "the community is learning and…the city folks are learning and the non-profits are all learning from each other, as we co-educate, we can create these campaigns."

Through CSN, residents were asked for their opinions as equal contributors to conversations and group decisions and the process of education within the group was mutual and bi-directional. Each person was assumed to possess meaningful knowledge and insight from their life experiences. Elenore said that being included in the decision-making process felt good because "nobody really asks the people who live in the neighborhood what they want anymore." She felt that the CAG's equitable approach stood in contrast to the kinds of pervasive negative messaging in society that defeats people with criticism—of one's name, way of talking, hairstyle—and offered instead a welcoming environment to anyone who wanted to contribute and participate. Instead of feeling beaten down by societal rejection, or giving up altogether, the group created an environment in which "everyone is working towards the same goal and we're all trying to do it, hand-in-hand together. Elbow to elbow, let's get it done. And that's the feeling I get from those meetings … It's always a, 'Let's do' instead of, 'No, you can't.' Let's do. Let's. We. Us. It was a togetherness thing, and that's the energy I got from day one." Elenore continued,

> 'Cause you get with some organizations and it's a lot of, "Okay, we're the organization and you're the people, and we want you to smile for the camera and stuff. We're gonna do this, you do that." I've been a part of those kind of deals. And I'd be like, "Uh-uh. I don't wanna be a part of that"…The fact that we're all coming together and creating this energy, that's a start. So, once you do that, nothing but good things can come out of that.

Faith said that the group culture introduced by the facilitators made clear that the main priority was to improve the community and that "it didn't matter what you do for a living, how much money you make, anything, what color you are, nothing. Just, how do you wanna make your community better?" Community members were paid for each meeting and that payment

was one of the first signals to the residents that their participation and time was valued and would not be taken for granted. As Jo Ann put it,

> We're living and breathing every single day, not just for a meeting or for a survey or to pick our brains, and having that authentic and sincere connection…and not just trying to go in and get information and then leave, I think that's the biggest thing…because so many times, people sometimes wanna pick your brain and not offer compensation.

Jo Ann felt that the organizers from both the nonprofits and the local government brought authenticity and passion for climate and community engagement to the process of building relationships, which made her "grateful to have been connected to them and continue to stay connected." Relationships that were built in the group between the younger and older group members were described by Gaby as "an ongoing partnership" and Faith went so far as to say that the alliances established between herself and adults that she didn't know before the meetings may be "the most successful thing about the [CAG]." The youth members of the group stressed the egalitarian culture of the meetings and the fact that the older adults included them as participants with valuable opinions, despite their younger ages. Morgan felt that "they really did take the time to listen to me, and care about what I was saying, and they were very interested in what I had to say." Faith said that everyone in the group made sure that "you knew your voice was being heard and…your ideas were really important." As relationships within the group deepened, Morgan noticed that the different generations brought distinct perspectives to conversations about action and community change,

> The older folks…they know how things have changed, they've seen the change with their own eyes. They know…the past, and what's going on in the present. While with the

young, [we] know what's going on in the present, and [we're] learning about the past so things can change in the future.

Elenore reinforced this sentiment and said that "we need to utilize the elderly population as well…people tap them out 'cause they're old, but they can do their part. They grew up around gardens and things of that nature." Faith felt strongly that when she is older, she wants to speak out on "tons of issues. Not just environmental issues, but societal issues, poverty issues, I wanna speak out on a lot of things." Morgan added that "the future is the youth" and she would like there to be more young people in future CAG groups for several reasons: because (1) she believes others would value the meetings as she did; (2) despite the inclusion she felt from the adults, she would be more comfortable with more peers represented as voices of their age group; and (3) because they will be "more active and around to see the change and experience the change" and "using the resources that are put in the neighborhood." She felt that she could take on the role of "speaking to kids around my age…I probably know how to get them interested in [CSN]. As an echo to Morgan's insinuation that young people have more time than adults to become community leaders and to appreciate the changes firsthand, Kesha reflected on Faith and Morgan's dedication to fight for LPH and said they made her feel that "when I get tired or when I'm through, or if I decide to move…there's still somebody here that's going to fight for it. We need these young kids."

Adherence to CAG ground rules and norms such as *listen to grow and not to correct others*, *know we're all doing our best* and *recognize alternative experiences and differences* provided the foundation for equitable group relationships and reinforced mutual respect between residents, organization employees, and city officials and between younger and older participants. Residents were considered partners and experts on local strengths, needs, and hopes and the

process of their contributing information while simultaneously learning how to be advocates for climate planning was essential to CSN principles. Bolstered by the sense of unity forged within the group, residents reported their intent to actively better LPH by serving as a citywide voice for the neighborhood, talking to other youth about CSN, and planning to evolve as future leaders of environmental and societal issues.

Barriers and Catalysts to Community Change

CSN nationwide aspires to spur large-scale community change and as part of that, the model created in Cincinnati makes the CAG the initial step of a longer-term movement towards resilient communities. Through mutual education, relationship building, and collaboratively identifying ways to build local climate resilience, the residents of the LPH CAG created a neighborhood plan to address climate vulnerabilities in their immediate environment. The larger, ongoing process of changing communities through climate planning includes developing resident leaders to advocate for opportunities and policies that strengthen their neighborhood and reducing the disparity in climate resilience between neighborhoods citywide.

The third research question introduces more viewpoints held by the group organizers and explores the ways that both residents and organizers of the CAG discuss barriers and catalysts to community change within the neighborhood as well as larger contexts. Six major themes were found: (1) Systems Knowledge; (2) Efficacy Beliefs; (3) Social Cohesion; (4) Using Equitable Procedures; (5) Political Context; and (6) Expectations. Each theme can act as barrier or catalyst that either stymies the potential of actions or facilitates successful follow through. It is within these themes that participants reflected not just on what the group did well, but what can and should be improved in future CAG iterations, given the program's intention to expand into additional Cincinnati neighborhoods.

Systems Knowledge

Familiarity with natural systems (e.g., risk factors for floods, landslides, pest migration, heat islands) enable one to better understand climate change vulnerabilities and environmental harms and how to help one's community mitigate or adapt to those harms. Max, a representative of the City Office of Environment & Sustainability, noted the need for more education in Cincinnati about extreme weather effects from climate change. He used the example that while everyone in Florida knows to put belongings on blocks, fill the bathtub with water, and board up windows to brace for hurricanes, the Midwest hasn't established an equivalent set of steps that prepare for the kind of climate-fueled weather that is becoming more prevalent in the Ohio Valley.

> What happens when those flash storms are coming? How should you prepare your basement? What are things to look for as you pick a home? Are you on a hill? Where is the nearest storm drain? Is that storm drain adequately maintained, what does the surrounding parking infrastructure look like? Is it going to funnel water to your house? These are things that are not part of anyone's conversation, but could be in the future, especially as we get these intensifying rainstorms.

He clarified that while the City provides educational materials on topics such as how to reduce one's energy bill, there has been less holistic messaging about ways to mobilize in anticipation of climate impacts, and thus lags behind cities with established resilience centers—central locations that serve communities with preparedness information and resources[i]. Jasmin, an organizer and employee of one of the partnering nonprofits, explained that the organizers aimed for a balance between discussing climate change impacts and providing practical resources with the goal to accelerate the process of building knowledge of institutional systems

in the community. She hoped that the "accessibility to organizations that can help [residents]" would lead to more participants working for change in the neighborhood. Luca (nonprofit organizer) said that it's critical to empower the community as strategically as possible because,

> A lot of the magic behind what we do and Climate Safe in general, is a pretty intimate understanding of systems. So that's funding mechanisms, that's right of-way in the streets, that's engineering, design, that's community economic development or different departments of the city, and what levers you can pull together. So just that starting place…empowering and working with the community and elevating voices…we have a lot of momentum there, but if you don't know where to direct that energy most strategically, there can be a lot of wasted time and effort.

Sonja said that it would be "a dream come true" to be able to eventually hire a CAG member for a paid position as a community climate liaison, who organizes other residents while learning to participate actively in the local political system.[ii] Kendra, representing the City as a college graduate in her mid-twenties, was struck by the feeling that she was witnessing CSN's attempt to reconcile the consequences of a longstanding frayed relationship between the City and citizens. Her participation in the CAG made an impression that City representatives need to more regularly meet people in person and in the residents' neighborhoods.

> There has to be more done to let people know about the Office of Environment and Sustainability, what we're doing, and the programs involved, because there's a lot of benefits to participating in the programs…a lot of people don't know about these.

Knowledge of how to navigate institutional systems that provide resources (i.e., government, local nonprofits, private businesses, financial-philanthropic sources of funding) are key components of communities' ability to access financial support for building climate

resilience. Conversely, discomfort or unfamiliarity within the institutional system can signal a lack of equity and a personal barrier to productive action and community change, particularly if combined with skepticism or ignorance about climate change. Jo Ann (resident) cautioned that the large amount of new information can be startling for residents whose conversation about the climate usually starts and stops at recycling.

> When you come from that state of mind and then you go into this and…there's so much to it, it can be overwhelming. But it also, for me, gave me confirmation about... systems that are in place, some that are very good that have helped and some that are failing us.

She was positive yet cautious when speaking about possible climate-related advocacy in the future. For her, the new information was "sparking interest…and answering questions, everything [that] was presented…it just made…me [want] to figure out more ways to resolve some of these issues." At the same time, she was discomfited by the depth and seriousness of the issues and the many layers to be aware of when advocating for significant change. With her new understanding of climate-related systems came a sense of responsibility, but lacking a vision for a future role she might fill, she described personal action as an open-ended and ambiguous possibility that would take shape as she learned more and as resilience work in the neighborhood progressed. Overall, Jo Ann stated that getting the ball rolling to initiate the community changes that are wanted is important and she sees that already happening.

> And Lower Price Hill was already so vibrant…I see constant growth…Everything that the people in the community has asked for and spoke of, I see it…like the flowers are starting to bloom…I think that things are blossoming but it takes time…I'm open to it, yeah, I'm open to it.

It was not only residents who felt at times overwhelmed. Luca admitted to a *where to start* feeling regarding the many powers and perspectives within a political system (e.g., Planning, Community Economic Development, Transportation, Engineering) and said, "we need champions in [City] Council and directors of departments." Kendra (city representative) felt that the CAG could have explored more deeply how social, environmental, and institutional systems are intertwined, in order to broaden the perspectives of the residents and their capacity to approach community change in different ways. She considered the institutional system from a human behavior perspective and said that "we have the ability to make change for ourselves…it's not just individual behavior…it's also with institutions and their decision making and holding them accountable." The majority of the group members spoke about individual-micro and group-meso actions that they were considering as a result of the CAG, while Kesha was inspired to engage with the institutional-macro system and said that "right now my next step is, 'What do I do next?' because in the back of my mind, somewhere between three and five years from now, I would really love to be on [City] Council."

Efficacy Beliefs

Two types of efficacy were apparent in the ways residents and organizers described process of catalyzing community change: (1) Self-efficacy, an individual's belief in their ability to behave as required to attain specific results (Bandura, 1977); and (2) Political efficacy, the belief that one is able to understand and influence political matters by changing policy and the government.

Self-efficacy

Self-efficacy as it relates to change processes was described positively by organizers and residents in terms of empowerment and shifting self-images that expand and allow individuals to

feel confident taking on new roles in their community. Ramona, a CAG organizer accustomed to nonprofit climate work at the county and regional scale more so than at the neighborhood level, praised the Climate Safe model of community engagement for considering individual community members to be significant stakeholders. She appreciated the CSN goal to "empower [residents] with opportunities and resources to take on and do what they want in their communities." Morgan's (youth resident) view of herself and her neighbors had changed since joining the CAG and she said that "I never really thought that there was gonna be that many people who'd be interested in certain things like this. 'Cause I didn't think I would be…someone who was in a meeting or learning something about this." Faith, the youngest participant, saw herself as a person capable of inspiring in others the curiosity and desire to learn that she had experienced in the CAG. Now, when she senses someone's interest in the community or the climate, she shares stories to "get them questioning…it's what happened to me. I just think people started raising questions in my head and I just ran with it, and I just want other people to do that."

Elenore spoke about the absence of self-efficacy that she witnessed in some of her neighbors and how it curtailed the possibility that they would try to change the neighborhood for the better. She believed that it is a challenge for residents to respond to community needs or initiate action if they haven't been encouraged in the past to take on such roles or delegated with such responsibility. As she put it, "It isn't obvious…that they themselves … can make a change. It never occurs because they've been told all their life, 'No, no, no, no, no. You're not good enough for this. No, you can't do that.'" While it can be a burden—of time, money, and energy—on residents to advocate for themselves when they are focused on survival, the question of how to fairly share the onus of community-building and creating partnerships with residents that are appropriate for individual capacities is a dilemma that must be faced. Elenore ultimately

concludes that climate resilience planning is crucial, even if the process is incremental, because climate change "is about to make a shift in our society."

> Climate change ain't on people's mind right now, they're thinking about keeping food on their table, keeping a roof over their heads…But at the end of all of that...It has to happen. Even with all of that we're facing, it has to happen, 'cause we all gonna be... It's one thing to be homeless. You planet-less?

Political Efficacy

Elenore and Kesha discussed how and why they believed their neighbors became immobilized when they lacked political efficacy and what effects that had on their own relationships to community change. Elenore said that people construct cognitive barriers to political change when they are not confident in their civic knowledge. When she talked to her neighbors and family about community issues, including climate change, a typical response she received was, "Oh, I can't do anything about that." Since the CAG, Elenore had come to consider her role as a community advocate who provided a counter viewpoint and assured others that they can, in fact, do something. She used voting in elections for City Council, Mayor and the Ohio Supreme Court as an example and a choice that she framed in stark terms. "Are you voting for life or death? Because we can't keep going in this direction, haphazardly just using fossil fuels, and letting it just tamper the atmosphere." She described the process as feeling that one personally *can* act, knowing *how* to act, and then *taking action.*

> Who do we need to call, who do we need to email, who do we need to write letters to…to get contact with our senators and politicians and our congressmen, a lot of people don't know how to look that kind of stuff up, especially in the neighborhoods, where

> there's…poverty…if you haven't been raised around research and looking up stuff…that's not gonna be your go-to thing.

In addition to her urge to increase the political efficacy of people around her, Elenore said that the CAG made her realize that more people are concerned about climate change than she previously thought. She found it gratifying to help raise climate resilience awareness in the neighborhood, and though more resident involvement is needed to enact large-scale change, "just that little area right there was a start and it made me feel good. 'Okay, at least we're starting to get the wheels moving.'" Kesha felt that some of her LPH neighbors don't engage in community advocacy or participate in the power system because they had accepted the label and identity of *marginalized*. Kesha didn't like the term because it connotes people on the outside without influence or power and said that she could see "the wrong…the difference, the inequality" in society and instead of being demoralized she believed in her ability to discuss neighborhood issues with political leaders in meetings or at City Hall.

> I can change this. I can go tell them that you're not going to keep seeing me like that. I can go to their face and dress up nicely and go tell them, "I'm not marginalized people. I got everything."

Social Cohesion

Social cohesion both within the CAG and beyond the confines of the CAG acted as a catalyst to community change. Residents spoke about how social bonds within the group and with other neighbors grew stronger over the course of the six meetings as a result of CAG activities. Discovering similarities between themselves helped to focus discussions on how they wished to change the neighborhood, particularly through the use of two exercises: (1) the resilience statement; and (2) the neighbor survey. The resilience statement, a weekly exercise in

which residents refined their group's vision of resilience based on what they learned that week, created a sense of cohesion within the group for Kesha because, "adding on to it and mixing it up and adding more words and…integrity in it, it feels like we are a strong community." Faith said, "We just talked about it with each other, 'What would make it better?' or 'What should we put?' And…our opinions were incorporated." Gaby was proud of the CAG members' effort to define resilience for their neighborhood and said it was "so good" when she recalled the final iteration,

> *A Lower Price Hill that rises together to overcome climate change, oppression, inequalities and adversity by promoting resilience, empowering and uplifting each other, being counted in the choices and resources for the wellbeing of our neighborhood, and being seen and heard as valued citizens of the city.*

Through the homework assignment in which the residents surveyed their neighbors and asked questions that included *What are three things you would change about Lower Price Hill?*, the residents found commonalities and common goals that helped them to trust that their neighbors cared about their mutual environment and shaped their own feelings of belonging to LPH. Said Faith, "the answers of the people I interviewed… like my aunts and church members…their main problems were problems that I also saw in the community." When Kesha talked to her neighbors, she said that they "came up with the same answers, they all want the store," referring to a small grocery that was due to open in LPH and would offer fresh produce to residents of the food desert. Kesha explained her motivation to be part of community change in terms of the relational support she feels between members of the CAG and with other residents of the neighborhood at large. She said that LPH residents take care of each other and because "I help them out, they help me out, we always speak, no matter what, everybody says hello…So that's what made me want to say, 'I will at least stand up for this community.'"

Social cohesion may be evident or lacking in horizontal relationships (e.g., neighbor to neighbor; individuals and groups) and vertical relationships (e.g., neighbor to government authority; citizen to state) and can affect recruitment for community change programs that engage residents such as CSN. Faith (youth participant) said that it was her bond with Sonja that propelled her to join the CAG. She knew the organizer from Sonja's nonprofit job in the neighborhood and Sonja's presence decreased the teenager's apprehension of speaking in front of others, "I feel like Sonja did make speaking in front of a bigger group very comfortable for me, and I appreciate that." Luca (nonprofit organizer) reinforced the idea that it was easier to recruit participants for the CAG when the resident already had a relationship with Groundwork and its staff. But even with that evidence of beneficial social cohesion (i.e., established connections between people in LPH were demonstrated by their choice to join a community program) and the financial incentive of $100 per meeting, Luca noted that "you still have to have people who care about the issues at hand, and with climate change that's difficult." Asked if she thought anyone was missing from the CAG, Faith spoke about a woman from LPH who was a well-known and trusted figure in the neighborhood, capable of connecting with many groups of people. Faith thought she would have been a good addition to the meetings because "everyone knows [her] and if she would talk about the stuff in the meetings with people…they might actually listen to her…everybody in the community knows her, from the addicts… to the new business-y people."

Ramona, Sonja, Faith and Kesha described the ways that aspects of language have the ability to strengthen or weaken the cohesion between people in the CAG and between individuals and groups in the community at large. Ramona (nonprofit organizer) reflected on how the intention of the CAG to provide equitable community engagement is associated with fluency

across varied styles of communication. She said that the organizers gained a new understanding of the diverse ways that people communicate about different issues and learned "how to step back and…leave room for them to bring whatever it is that they're going to bring to the space, and not to add our own interpretations or our own thoughts to that." She noted that "there should be folks in the meeting who look like the community members, speak the same language, technically the same language, and also use language in the same ways, have the same kind of vocabulary." Sonja (nonprofit organizer) was grappling with the connection between CSN's goal to change systems and the relationship between the City Office of Environment & Sustainability and LPH. She said that "Lower Price Hill people say in general, they feel ignored by the city, but to have the city come in and listen and then leave isn't great either." She wanted to resolve how to continue more direct involvement between the city officials and the neighborhood and said that "creating a long-term systematic change is something I'm struggling with." Faith (youth participant) said that the city should implement more direct face-to-face communication with people in LPH because [LPH residents] rely on in-person communication. If you wanted someone in the neighborhood to know something, you had to talk to them. She felt "that's just how the world should be like, if you want somebody…to be a part of something, you gotta interact with them."

Kesha (resident) noted that half of her neighbors "still call themselves Appalachian" and that the African American-Appalachian neighborhood already knows how to coexist, "we just need to learn to rise together." In contrast, she said that the social connections between the White and Black population of LPH largely did not extend to the Spanish-speaking residents of the neighborhood. This may be considered a barrier to social cohesion and community change given that CAG materials were not translated into Spanish and there were no monolingual Spanish

speakers in the group. With the exception of the language divide between Latino and non-Latino residents, neighborhood patterns of social cohesion and instances of social capital are described by LPH residents as contributors to community change. The cohesive strengths are based on (1) relationships inside and outside the group that span divides such as race, class, and authority and are sustained by face-to-face communication; (2) activities within the group and the neighborhood that solidify a shared sense of place; and (3) the action of joining the CAG. CAG organizers reported that cohesive social bonds and additional financial incentives are not always enough to sustain community engagement in disadvantaged neighborhoods and that the organizers learned to better facilitate groups with different communication styles.

Using Equitable Procedures

Equitable procedures are the methods used by group organizers and facilitators with the goal of ensuring that meetings were accessible to residents and appropriately addressed what they needed to participate. They include multiple options regarding the logistics of outreach and meeting details that take resident time constraints into account, providing the use of and training on technology used, and attention to the nuances of procedural equity when discussing concepts that may be new to group members. Aurora (nonprofit facilitator) wanted CSN to do more than just bring more people to the decision-making table; she wanted to "break the table and rebuild the table." She said that even though "it can be hard to imagine shifting more [organizer] capacity and time to ensuring that engagement is consistently happening," it was important to her that CSN do so, to ensure that residents don't feel studied as an isolated incident. She envisioned a future in which workshops open to all community members are regularly held to discuss implementation progress and opportunities, as a way to make the work of the CAG accessible to everyone in LPH. Other organizers reflected on the need to invest substantial effort to reach

residents, stated by Max as "meet people where they are, and not just do your email blast call to your supporters to have them show up." Luca said, "There are all sorts of [community-based] efforts swirling around, and often, if you're not in a certain socio-economic class or you don't have the time to attend 100 meetings a week…you just don't know about them," while Sonja was considering how to partner in the future with existing meetings in LPH so as not to burden the residents' already busy lives. Ramona noted that isn't enough to say, "'Hey, we held this community meeting, and we invited people to show up and no one did,' but *why* is no one showing up?" She continued,

> If we really believe that community members are a valuable stakeholder group, what are the actions that we need to take to ensure that they are engaged and that we have adequate feedback to inform whatever plan that we are creating?

Gaby, as the group member who had lived in the neighborhood the longest and had been a LPH resident for her entire life, was not unfamiliar with speaking up when something needed to be done in the neighborhood. She had served on committees and was invested in the differences that she wanted to see happen. After the CAG, she felt nervous but motivated to go City Hall to advocate for LPH, but pointed out the logistic challenge that City meetings occur during her workday and "even when Zoom's an option, you can't always break away from your work just to go on the computer." Physical and technological accessibility remain barrier issues for sustained community member participation and if the specific needs of residents are not incorporated into group planning, the opportunity to change the community collaboratively will swiftly end. A critical part of gaining an understanding of a neighborhood's needs is accomplished by partnering with known and trusted individuals in the community (i.e., Groundwork ORV) to uncover and address the initial factors that enable people to participate in

a program such as CSN. In doing so, the CAG logistics were tailored for the LPH population to the limited extent that it was possible due to COVID in early 2021: providing meeting times after the end of most people's workday, training on how to meet virtually, the technology (i.e., computers at the Groundwork ORV office) needed to meet virtually, and payment. Luca (nonprofit organizer) said that a difficult aspect of COVID was having the group constricted to meet by Zoom and knowing how many residents don't have home computers, Groundwork ORV opened their office at night "for people to use our computers." During meetings Kendra (city representative) served as a "Zoom tutorial guide", helping the participants get comfortable with the software. Once residents joined the CAG, keeping participants was a challenge for organizers. Retention suffered due to family health emergencies and other family needs, and one resident attended several meetings but left when hired for a full-time job with conflicting hours, which revealed the sort of difficulties that arise when engaging communities in long-term thinking if their short-term burdens are acute.

The residents that stayed still dealt with discomfort. Elenore used the sometimes challenging lexicon of climate change as an example of how thoughtful communication and presentation can ease anxieties of group members because "there are some vocabulary words that some people aren't familiar with, so sometimes you gotta break it down a little further…If don't nobody say they confused, you don't know they confused…so it just had to be broke down." Because residents did not always want to admit when they struggled to understand new concepts, it was good practice for organizers to consistently explain important ideas from the bottom up when first introduced. In this way, the facilitators established an equitable foundation of knowledge for the group without the need to repeatedly gauge the collective learning curve and adapt explanations accordingly. Darrell, who had been a part of creating earlier versions of the

Green Cincinnati Plan, noted that the plan's emphasis had shifted over the years from decarbonization and sustainability to resilience and now climate equity. He felt that through the CAG, the City's understanding of how to equitably and directly engage residents had advanced significantly,

> Distinguishing between distributional and procedural equity has been really helpful... Historically, we have a lot more to show on the distributional equity side than we have on the procedural, so this is a significant procedural equity advancement for city government…we were able to pay residents to participate as one of the key benefits.

He described judging the extent to which CSN catalyzed community change as a question of depth versus breadth. Darrell was unsure if the process of developing deep relationships with a small cohort in LPH happened quickly enough to be equitable at the scale of the citywide population that he was responsible for and didn't know if they had engaged "enough people given the level of effort. I don't know how to find the sweet spot…but one of my big question marks about the program and its future is how do we do that."

Political Context

The relationship between political context and community change is based on the fact that programs backed by the government are vulnerable to the fluctuating priorities of political offices. When new administrations focus their attentions on the topics important to the office and its constituents, existing initiatives not in favor may suffer from loss of support, financial or otherwise, and lose momentum or even end. The reality of community organizing is that many nonprofit projects, programs, and organizations depend on grant funding and partnerships from a variety of sources, including public sources, to operate. Thus a politically resilient entity is one with a spectrum of support broad enough to withstand changes in political leadership. Luca

believed that a strength of CSN is its data collection. Since data can be discussed and dissected in different ways for people with varying values and concerns, it has the potential to appeal to people who lean to the political Left or Right, a quality that Luca called,

> The beauty of Climate Safe…you just have a map, it's just like, 'This is the data….' We can democratize the data, we can arm ourselves and our neighborhoods and our youth and our residents with data that people understand and have to respond to.

Even with the history of redlining as a potent example of how maps and data can be manipulated, Luca believed that good-faith efforts by CSN to establish benchmarks, track progress, and provide evidence of success could increase the ability of climate planning advocates to "lobby different angles" when seeking support for the program, thereby strengthening CSN's capacity to grow and thrive in shifting political contexts. Darrell, on the other hand, focused on personal stories as a powerful method of connecting with people across the political spectrum on issues that affect the community and said,

> With time I've come to question whether the technical information is really that critical. I think storytelling, particularly about members of the community, goes much further…you can talk about the increase in flooding that we're seeing with increased storms or you can show a picture of someone dealing with flooding at their home or in their car or in their community and I think the latter, the storytelling, can be paired with data which makes a much stronger impression on the recipient.

Aurora expressed concerns that partisanship within city government makes CSN's potential to implement change in communities over time vulnerable to voting cycles. She asked, "What if we don't get those funds from the next mayor, or what if there are more strings attached from different leadership?" Aurora felt that there must be an "understanding that the City Hall as

an organism is also always changing, and we have to be prepared for political shifts, and leadership and control shifts." The question of how to protect the political resilience of CSN "is something we need to talk about in the long term." Without all the answers for how to prepare for shifts in leadership, she recommended that climate planning organizers continue to seek buy-in from city departments and to promote the program at neighborhood and organization levels through consistent and ongoing communication. In the short term, however, the residents reported that when the CAG ended the organizers lacked clarity in communicating the next actionable steps for advancing the climate resilience work they had started. This was perceived by some of the residents as a barrier to maintaining the momentum built by the CAG's community engagement and is addressed in the following section as it directly affected resident expectations.

Expectations

A key barrier to community change identified by residents and organizers was an inconsistent or unclear expectation about the future steps for building climate resilience. Program content was unknown to the residents when they joined CSN so they began the CAG with broad expectations, as expressed by Morgan, "To learn more about the community," Gaby, "I just wanted to try it out," and Jo Ann, "To learn more about the environment." By the end of the meetings, residents had more developed goals for LPH and questions about the future so the analysis of their expectations focuses on resident thoughts about what comes next. Organizer goals were centered on two explicitly stated program objectives that were agreed upon by the group—to (1) create a climate resilience plan that uplifts the community voice and meets its needs; and (2) find the best way to engage communities in climate planning—as well as

assessing how to continue these entirely new processes. Organizer expectations are examined in relation to how they were described as barriers or catalysts to community change.

Through the CAG, residents gained definite ideas about changes they wanted to implement in their neighborhood. The LPH Climate Resilience Plan (Figure 1), a neighborhood map displaying locations that the residents chose for cooling centers, greenspaces, community gardens, green parking lots and roofs, asphalt sealant crosswalks, misting bus stops, and street trees, was overwhelmingly considered a key result of the CAG by residents and organizers alike. Residents spoke about the resilience map with pride for what the group had created for their neighborhood and appreciation for the cooperative process, stated by Faith as "really good to get different people's opinions," while Kesha said, "Our resilience plan is the bomb." Organizers focused more on the map as a program objective, a tool for fundraising, and to inform the 2023 Green Cincinnati Plan. Aurora, a nonprofit facilitator who played a key role in bringing the organizing partners and residents together to create CSN in Cincinnati viewed the LPH resilience plan as a democratic "tool that folks can use to engage with other organizations [and] other funding opportunities to deliver on the resident-led vision, and they don't necessarily have to sit around waiting for city-led timelines." Darrell (city representative) considered the map to be a tool that is useful as "a clear statement of community desire, at least the community desire of our small cohort of participants, and a deliverable that aligns with goal number one," while acknowledging that delivering on the map's details will require additional new processes and mechanisms, "so we'll have to see how well we can follow up on that." He continued,

> I don't know that we had crystal-clear goals from the outset, either from the organizers' side or the participants side, so I think it's difficult to say, "Yes, we delivered on our goals"…But I do think it was a series of really great conversations. And I think

everybody who was involved learned from each other, and I think sometimes it's slow, sometimes it's uncomfortable, but there is progress there.

Organizers understood the psychological benefit that residents would gain from quickly seeing a visual impact from the project and thus had preemptively submitted a community budget request for street trees to plant when the CAG ended. Sonja (nonprofit facilitator) was excited about the resilience map because she was in a position to begin procuring the trees for sites prioritized for revitalization or forestation. She took residents' recommendations from the map to start working on a vacant lot with Groundwork ORV's Green Team youth workforce and was "waiting to hear back from the city to see if we can plant 40 street trees in the neighborhood." She said that "we're planning on having [the LPH Climate Resilience Plan] included in the Green Cincinnati Plan as an appendix, and in that way it will be formalized in the city." Max said that the resilience map informed how the City Office of Environment & Sustainability thought about the 2023 Green Cincinnati Plan (e.g., by examining city data at aggregate and neighborhood levels and prioritizing neighborhoods by specific needs) and "when we talk about actions to help mitigate vulnerability." As for funding the neighborhood plan, Sonja said "that's one of the biggest barriers." She was thinking about how to create "a climate resilience fund for the city that vulnerable groups can use to…apply to fund projects in their neighborhoods, but no such thing exists right now." Jasmin (nonprofit organizer) explained her view of the existing approach to implementation: achieve the simplest goal on the map and follow by working towards more complex methods to cool the neighborhood, adding that "the cooling station at the bus stop was something that they really wanted." Luca (nonprofit organizer) felt strongly about the need to complete resilience interventions from the plan over the long term. If efforts stall at the mapping stage and do not lead to actions, the project would be

another feel-good exercise that doesn't change anything in LPH, a community he called a "graveyard of pilot programs." He would consider this outcome devastating for the integrity of CSN and its organizers and a barrier to neighborhood change due to damaging trust with residents.

> It's really important to show momentum. Especially in neighborhoods like this that have been planned to death, and you know, have been studied and nothing ever happened. So that accountability is really important to us. We're still not perfect, we need to put up and show out for the community if we're gonna ask them to take part in this type of thing.

Luca added that implementation should be done alongside parallel methods of monitoring environmental and socio-demographic indicators to "look at income, median household income throughout the neighborhood, look at air quality, look at surface temperature, those things would be great to continuously monitor that, see if anything changes over time." Establishing baseline data that can be used to monitor progress would catalyze community change through the ability to measure ongoing change, to provide evidence of achievements, to hold programs accountable, and to demonstrate when neighborhoods become more equitable.

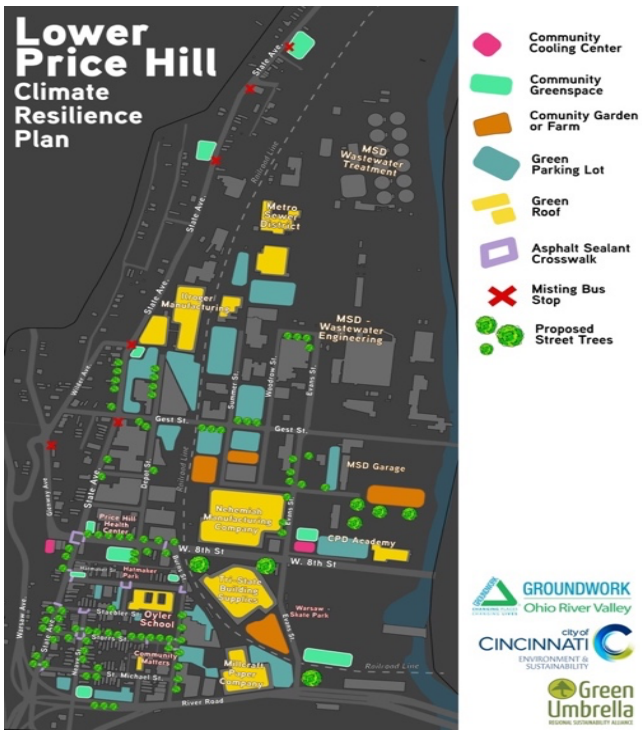

Figure 1. *Lower Price Hill Resilience Plan*

Judging how well the expectations of the second program objective were met (i.e.,

finding the best way to engage communities in climate planning) is more subjective and open-ended than creating the LPH resilience plan. New methods of community engagement for Cincinnati were explored and praised by participants, particularly around knowledge gained and relationships developed. The engagement began to build a social infrastructure that would support climate planning in LPH. It was stated repeatedly in interviews, however, that the group did not discuss timelines for goals. Ending the program with murky views of how to plan and pay for implementations from the resilience plan was a barrier that made it difficult for some of the residents to envision the path ahead. As stated by Faith (youth participant), "one thing that was missing is we didn't talk about…long it would take to see results," which she said would make you "feel like you actually were working for something, you aren't just wasting your time doing unrealistic ideas, you were actually helping your community." Gaby did not know how the resilience map would be shared with more LPH residents or if there was a plan to do so. She was open to re-involving herself with CSN "maybe behind the scenes, and maybe in future meetings" to share findings and compare plans when additional neighborhoods form CAGs but unaware of specific needs or requests, she did not have immediate intentions to remain active in climate planning. Morgan (youth resident) understood that only so much information fits into six meetings but it would "help if they spoke more about future planning of Lower Price Hill…I probably could give much more input since I've been here for a little while, and I plan to stay in the community." Kesha (resident), on the other hand, was not deterred from acting on the changes that she wanted in LPH and said, "I'm in the neighborhood business alliance and we're trying to talk to [Groundwork staff] …to see how they can help us implement a plan, all flowers and trees." She said that "you just got to have the strength and the power of what you want your neighborhood to look like. What you want your neighborhood to be."

Organizers were aware of when the pilot's engagement plan fell short. When they spoke of their difficulty in communicating to residents how to advance the resilience plan further, they cited breaking new ground in an unfamiliar area of deep neighborhood engagement as an impediment to continuous movement forward but one that would be temporary. Max and Sonja both described the challenge of guiding the residents into the next phase of CSN. Sonja emphasized that CSN as a new national initiative was taking shape uniquely in Cincinnati because "a lot of the other Groundwork trusts have done outreach presentations to multiple groups, [but not] an intensive resident group like we have here." Max said that from his city perspective, the CAG was being created in real time as "the conversation starter that sparks the bigger policy discussions." The organizers intended to direct lessons learned from LPH back into the neighborhood and towards future climate planning in additional neighborhoods with the City Office of Environment & Sustainability as a continuing partner. Max also added that even when program and implementation processes have been established as clearly as possible, providing quick or simple answers in climate work can be as complicated as producing results. He used the example of intricate cause and effect relationships combined with resource limitations that "become communication puzzles for all sides to figure out," and said that it is a hard conversation "when you tell somebody that your neighborhood is…prone to flash flooding and will continue to be…and you don't have a direct, easy solution to fix that problem."

As Kendra, a city representative who would soon transition into the nonprofit sector, looked forward to what the CAGs could do better, she felt that the meetings should increase their focus on future actions for residents. If they spend more time "talking about where do we go from here…and how to continue the relationship with LPH as we look to communicate with other neighborhoods with this project," the added direction and clarity may enable more

sustained community change. Within the process of neighborhood level engagement, there is a balance to strike between building resident capacity while creating a shared understanding of realistic expectations and next steps to take. Some of the changes will require a long-term planning and evaluation and care must be taken to help community members feel that goals that don't happen overnight are still possible. Herein lies the tension between Luca's organizer outlook that "it'll take years to see to what degree the map reflects a future reality" and Faith's perspective as a community member.

> I feel like the only thing that was missing is actual results. We did plan a lot, we talked about a lot, but to see the results of some of the stuff we went over, it would be really helpful and make you feel like you actually made a change.

Discussion

The purpose of this study is to explore the participatory processes of community engagement from a psychological perspective in the context of climate change and its disproportionate effect on urban neighborhoods. By analyzing the experiences of group members from Cincinnati's first cohort of CSN, an equity-focused neighborhood-level climate planning program, this case study informs a growing body of literature on the planning of local climate adaptations and highlights an element that is often missing: residents of disinvested neighborhoods. This study looks at how CSN prioritized resident knowledge and expertise, how resident perceptions about local issues changed through their participation in CSN, and how participation affected residents' potential to act as advocates for their communities. Further, the study describes barriers and catalysts to implementing locally relevant community change as identified by both residents and organizers. Key findings were that residents gained a deeper overall understanding of how climate issues in their community connect to each other and to

their own personal lives, and those who built mutually respectful relationships with neighbors, community organizations, and city officials were more likely to act as climate resilience advocates. Notable factors named by residents and organizers for their capacity to sustain community change in this context include the ability to navigate institutional systems, the belief that one is able to understand and influence political proceedings, the use of framing that enables climate change concepts to appeal to people with different political backgrounds, and interventions that are planned and communicated alongside realistic timelines and methods to monitor progress of results. When the interpersonal and knowledge-building components were present and practiced, connections between participants strengthened as did their desire to continue learning and engaging with others. The less developed parts of the new and evolving CSN engagement model that were not explicit about next steps brought about uncertainty and unclear expectations about the future.

Perceptions and Actions of Residents

CSN used key strategies to promote equitable resilience through changing perceptions and actions of residents. Program strengths that were noted by residents and organizers served to motivate participants through the feeling of personally knowing more and being capable of doing more; supported the sociopolitical development of the youth group members; and contributed to climate change resilience via the social capital gained through social learning and relationship building. The relationship between knowledge, motivation, and action seen in this study are consistent with Solhaug (2006)'s assertion that while knowledge produces informed citizens, information alone is not enough to reliably induce civic participation. Knowledge in combination with self-efficacy, however, results in more capable citizens who have reasons to act and feel able to do so. Over the course of six meetings, LPH residents gained a large amount of

knowledge about how their city's history has affected their environment and lives. That information, the backdrop that motivates and precedes action, is then only as effective as its associated goals are clear, explained by Solhaug to be, "self-efficacy organiz[ing] knowledge and information as the basis for action" (p. 274). In the case of the CAG, most residents did not feel informed enough to take on administrative burdens such as seeking grant opportunities or writing grant applications, nor did they attempt large mobilizations of their neighbors in favor of the implementations from their resilience plan. Rather, their future plans of action reflected the goals that they considered reachable: to continue learning individually, to talk individually with their neighbors about climate change, and to continue connecting with each other while waiting to be informed by organizers on further CSN developments. It must be noted, however, that one of the six residents was not deterred by her lack of experience or familiarity with the workings of institutional systems and its channels of communication and funding; she felt confident in her ability to function within the local political system and compelled to find ways to exercise her sense of political efficacy with the eventual goal of election to City Council. This finding has implications for why one resident's response was more proactive than the rest of the group and whether it can be attributed to particulars of her life (e.g., available finances and time or existing self-esteem) or to specific aspects of the engagement procedures that should be included in future CAGs.

The two adolescent group members showed no hesitancy to continue learning about local environmental and climate issues by working with the Groundwork ORV Green Team, and their social identities as community members grew through CAG participation. Though they would have preferred more young peers present in the CAG, they overcame the initial discomfort of sharing their ideas with a group of adults. The confidence they gained through building

respectful adult relationships and developing knowledgeable social and political opinions was reflected in the way they talked about the future: *when* they are leaders, *when* they are pillars in the community, and *how* they will persuade their neighbors to care about the climate. The certainty with which they spoke about future advocacy may be partially attributable to what Watts and Halcovic (2022) refer to as opportunity structures: resources and organizations available to support the skills, knowledge, and abilities needed for youth engagement and sociopolitical development, described by Watts et al. (2003) as the "process of growth in a person's knowledge, analytical skills, emotional faculties, and capacity for action in political and social systems" (p. 185). Unlike the adults in the CAG, whose pathways forward were not clearly illuminated, the Groundwork ORV Green Team offered the teens an option for immediate action. Also relevant to CAG youth and community action is the concept of their biographic availability, defined by McAdam (1986) as "the absence of personal constraints that may increase the costs and risks of movement participation" (p. 70), such as marriage or full-time work. In the same way that young age is considered a source of greater biographic availability, so is old age since the elderly are more likely to have retired and have less family responsibilities (Beyerlein & Hipp, 2006). Residents spoke of the benefits to be gained from including more youth and elderly participants, primarily as sources of increased peer comfort and perspectives. The literature agrees that the reciprocal process of social learning that changed the residents from individuals with their own interests into a collective with a common purpose (i.e., to make their neighborhood more climate resilient) (Allasiw et al., 2023) would be strengthened by including more perceptions (Mostert et al., 2007). The behavior of the CAG youth members, specifically their goal-oriented determination and use of the neighborhood opportunity structure, suggests that it would benefit later community engagement efforts to ensure a variety of ages.

Social learning contributed to equitable relationships built on social capital, itself an important indicator of climate change resilience. Social capital between people is a resource gained from mutually beneficial human relationships (Putnam, 1993; de Souza Briggs, 1997) that are neither financial nor transactional but relational. It provides practical and psychological support for the stressors inherent to climate change, and can reduce vulnerability, strengthen adaptive capacity and in theory affect policy implementation through increased participation and cooperation (Joshi & Aoki, 2014; Shimada, 2015; Ntontis et al., 2020). Findings from this study help shed light on how community-engaged programs such as CSN can build resilience at the local level via social capital, seen in LPH as the bonds of mutual trust and shared goals that drew residents closer to each other. It is closely related to social cohesion, with one difference being that social cohesion is built over time by repetition and patterns and not defined by isolated incidences. Social capital does not always imply social cohesion, given that capital among segregated groups does not lead to a cohesive larger society (Chan et al., 2006), a relevant point when considering that (1) a segment of the LPH population was not part of the CAG due to a culture and language barrier; and (2) although, through CSN, the City began to repair the long-term disconnection that existed between LPH residents and local government, it will take much more repetition of direct contact and communication over time to establish a truly cohesive relationship and society. The view of social cohesion and community change used here is oriented to social psychology and refers to "how well people 'stick' to each other", a stickiness judged by whether individuals can trust, help and cooperate with each other; if they share a sense of belonging to their society; and whether those subjective feelings are demonstrated through objective behavior (Chan et al., 2006; Uzzell et al., 2002). This study showed evidence of increased capital within the group, neighborhood, organizations, and government but CSN

cannot be expected to affect the overall social cohesion of the neighborhood until Spanish-speaking residents are integrated into the engagement process, local government sustains a pattern of ongoing communication with residents, and behaviors that demonstrate those relationships are observed— an area for future research on the nature of transformative, long-term community change to examine more explicitly.

Change Processes for Equitable Community Resilience

The ability to plan participatory climate adaptations is increasingly critical for the longevity and health of cities but as a newer area of municipal policy, clear guidelines for doing so are scarce. Governance structures are often expected to make innovative decisions about implementation using traditional lines of thinking that include top-down planning with generalized protocols not appropriate for all geographies and aggregated data collected and applied without considering localized "goals, risks, vulnerabilities, levels of income, political institutions, and social and political dynamics" (Carmin et al., 2013, p. 38). The urgent task at hand is learning—based on one's location—how to progress from (1) planning adaptation strategies with community members to (2) implementing the strategies and then (3) being able to credibly prove that the strategies grounded in place-specific knowledge have a significant positive effect on the community (Baker et al., 2012). Though the primary weakness of CSN was moving from the planning phase into action/implementation with residents, the program did share strengths from the literature that can be generalized. CSN findings that reflect a review of empirical studies on public engagement around climate adaptation using qualitative methods to gather participant perspectives include increased problems knowledge (what is happening) and action knowledge (what can be done about it) (Archer et al., 2014; Cloutier et al., 2014; Uittenbroek et al., 2019); and increased community support of decisions (Mostert et al., 2007;

Palermo & Hernandez, 2020). Still, Ensor and Harvey's (2015) place-situated and shared-purpose definition of social learning emphasizes the critical importance of resulting actions which "take learning and change beyond the individual to communities, networks, or systems; and enable new shared ways of knowing to emerge that lead to changes in practice" (p. 510). CSN organizers skillfully communicated the local risk factors from climate change to the neighborhoods' natural systems and built infrastructure. Group discussions helped all parties better understand LPH's existing strengths and how to better protect themselves. From this residents gained a sense of community from a resilience perspective and desire to improve its conditions (Procentese & Gatti, 2022) but as much as the organizers tried to provide practical resources about key institutions, it was an overwhelming amount of information to convey or absorb in a limited amount of time, expectations were unclear, and the transition from planning to action suffered as a result.

The path of public participation in climate planning is not linear, progressing neatly from information to awareness to action (Ayers, 2011), and CSN organizers were keenly aware of the immediate need to start constructing step (3) above (i.e., the ability to credibly show that, once implemented, CAG resilience strategies make a significant difference). With city grants, the University of Cincinnati-led team produced the Climate Equity Indicators Report (Even et al., 2021), whose data established baselines for each of the city's 52 neighborhoods across dozens of indicators (e.g., health, infrastructure, environmental, and socioeconomic) in order to gain a relative sense of how local communities are experiencing climate impacts. These quantitative markers, when repeatedly measured over time, are expected to be used to compare outcomes to past levels and to those of other communities. The report represents one half of the methodology (i.e., using data) that organizers wish to create for monitoring progress and growing support for

climate planning and it also addresses a known barrier to gaining support for city climate planning by policymakers and the general public—*access* to local data on changing climate effects (Carmin et al., 2013). The other method that organizers spoke of, the use of personal stories, was not yet utilized but should be considered in light of research that indicates the power of personalized stories to elicit emotional and empathic responses that are of particular need when the topic, like climate change, is complex and scientific (Wald et al., 2021) and "thus, when the goal of communication is to motivate action, personalize storytelling may be key" (Wald et al., 2021, p. 2). Further, personal stories in combination with frames that shift the focus of climate issues (e.g., economic development frames view climate planning as an economic investment/point of competitiveness while social progress frames climate issues as a means of improving quality of life/solving problems) (Nisbet, 2009) may allow climate planning to exist in a less polarized political context that makes it more resilient to the political churn of inevitable administration change. Interestingly, research on the emotional flow of climate communication found that the feeling of fear followed by hope most strongly influenced positive advocacy behavior (Nabi et al., 2018).

Just to participate in community climate engagement, residents overcome hurdles such as the fact that public planning is rarely apolitical or free of conflict, so patience for difference is essential (Hügel & Davies, 2020). People shed their disassociation between climate change and everyday life that may be also paired with the sense that the problem, even as a detached and distant concept, is too overwhelming to tackle, only to find themselves with less than crystal clear expectations about how to move forward as advocates. Some changes and resilience implementations will require more persistent co-production than is currently the norm (Jagannathan et al., 2020) and care must be taken to help community members feel that goals

that don't happen overnight are still possible[iii]. The overarching goal of transformative adaptation that alters systems and faces the root causes of vulnerability will not be reached by a singular path. Work is being done to identify the characteristics of transformation and some of them—restructuring, innovative, multiscale[iv] (Fedele et al., 2019)—can be seen in CSN's questioning of knowledge systems and investing in participatory collaboration, monitoring, and evaluation. CSN organizers were not prepared to transition immediately with residents from planning to action because they were solving brand-new problems and innovating as they went. Beyond the intention to incorporate the LPH resilience plan into the larger Green Cincinnati Plan and to update residents as the program expanded, the future of CSN was not yet determined at the time that the LPH meetings ended.[v] What was known is that planning for urban climate resilience should be a place-based, long-term focused, bottom-up partnership that makes people feel as CSN did, that they have power within their community and that what they say and do is of value.

Limitations and Future Research

There are limitations in this study that are important to recognize. The assessments made about impacts of this model of community engagement are based on a small sample of 14 participants. The cross-sectional design of the study bases its findings on data collected at one point in time, namely through interviews that were conducted three to four months after the engagement period ended. Future research is recommended to use longitudinal designs that conduct interviews immediately after engagement, followed by interviews at one year (and later) in order to better gauge the extent of change over time in resident and organizer perceptions, behaviors, and expectations as well as material progress made toward stated objectives. In addition, future analysis is advised to incorporate data from pre- and post-surveys administered

to participants as the community engagement model expands into more neighborhoods in order to establish a growing dataset on participant impacts that can be quantitatively analyzed. The combination of these two recommendations will allow for a mixed methods approach that combines the strengths of neighborhood-specific qualitative findings and more generalizable findings from citywide averages. In addition, more care should be taken to ensure representation of residents from ethnic groups who may be alienated due to culture or language barriers as well as people who live in different geographic parts of the neighborhood, since their experiences within the community may differ in ways that could contribute significantly to study findings, potential outcomes, and social cohesion.

Conclusion

The CSN approach to neighborhood-level community engagement aimed for equitable results that are produced through equitable means (i.e., relationships and procedures), in other words, the process of the participation mattered as much as the outcome. Participatory climate action planning has focused more on identifying existing problems and prospective solutions than implementing specific adaptation strategies, particularly for neighborhoods marked by disinvestment. Developing methods to measure outcomes is underway in Cincinnati with the goal of providing evidence of progress using neighborhood-specific data and the stories of individual people. It is hoped that the findings from this study will help researchers and practitioners create procedural roadmaps for participatory climate planning that are aligned by principle but geography- and context-specific, that result in measurable and meaningful outcomes, and that ultimately alleviate disparities between neighborhoods, demonstrating without a doubt the value of engaging equitably with people to develop more resilient cities that are prepared for inevitable climate impacts.

References

Agrawal, A. (2008). *The role of local institutions in adaptation to climate change.* The World Bank. https://openknowledge.worldbank.org/handle/10986/28274

Akompab, D. A., Bi, P., Williams, S., Saniotis, A., Walker, I. A., & Augoustinos, M. (2013). Engaging stakeholders in an adaptation process: Governance and institutional arrangements in heat-health policy development in Adelaide, Australia. *Mitigation and Adaptation Strategies for Global Change*, *18*(7), 1001-1018.

Allasiw, D. I., Tanaka, T., Kudo, S., & Mino, T. (2023). Opportunities and limitations to social learning for sustainability: empirical insights from a participatory approach to community-based resource management in the Philippines. *International Journal of Agricultural Sustainability*, *21*(1), 2239075.

Anguelovski, I., Shi, L., Chu, E., Gallagher, D., Goh, K., Lamb, Z., ... & Teicher, H. (2016). Equity impacts of urban land use planning for climate adaptation: Critical perspectives from the global north and south. *Journal of Planning Education and Research*, *36*(3), 333-348.

Archer, D., Almansi, F., DiGregorio, M., Roberts, D., Sharma, D., & Syam, D. (2014). Moving towards inclusive urban adaptation: Approaches to integrating community-based adaptation to climate change at city and national scale. *Climate and Development*, *6*(4), 345-356.

Ayers, J. (2011). Resolving the adaptation paradox: Exploring the potential for deliberative adaptation policy-making in Bangladesh. *Global Environmental Politics*, *11*(1), 62-88.

Baird, J., Plummer, R., Haug, C., & Huitema, D. (2014). Learning effects of interactive decision-making processes for climate change adaptation. *Global Environmental Change, 27*, 51-63.

Baker, I., Peterson, A., Brown, G., & McAlpine, C. (2012). Local government response to the impacts of climate change: An evaluation of local climate adaptation plans. *Landscape and Urban Planning, 107*(2), 127–136.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191.

Ballew, M. T., Leiserowitz, A., Roser-Renouf, C., Rosenthal, S. A., Kotcher, J. E., Marlon, J. R., ... & Maibach, E. W. (2019). Climate change in the American mind: Data, tools, and trends. *Environment: Science and Policy for Sustainable Development*, *61*(3), 4-18.

Beyerlein, K., & Hipp, J. (2006). A two-stage model for a two-stage process: How biographical availability matters for social movement mobilization. *Mobilization: An International Quarterly*, *11*(3), 299-320.

Bierbaum, R., Smith, J. B., Lee, A., Blair, M., Carter, L., Chapin, F. S., ... & Verduzco, L. (2013). A comprehensive review of climate adaptation in the United States: More than before, but less than needed. *Mitigation and Adaptation Strategies for Global Change*, *18*(3), 361-406.

Bowler, D. E., Buyung-Ali, L., Knight, T. M., & Pullin, A. S. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landscape and Urban Planning*, *97*(3), 147-155.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Brink, E., & Wamsler, C. (2019). Citizen engagement in climate adaptation surveyed: The role of values, worldviews, gender and place. *Journal of Cleaner Production*, *209*, 1342-1353.

Burton, P., & Mustelin, J. (2013). Planning for climate change: Is greater public participation the key to success?. *Urban Policy and Research*, *31*(4), 399-415.

Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity*, *56*(3), 1391-1412.

Carmin, J., Dodman, D., & Chu, E. (2013). *Urban climate adaptation and leadership: From conceptual understanding to practical action.* (OECD Regional Development Working Papers 26). OECD Publishing. https://doi.org/10.1787/5k3ttg88w8hh-en

CAPA Strategies. (2020). *Cincinnati, Ohio: Heat watch report.* City of Cincinnati, Office of Environment & Sustainability. https://www.cincinnati-oh.gov/sites/oes/assets/File/Summary_Report_Heat_Watch_Cincinnati.pdf.

Chan, J., To, H., & Chan, E. (2006). Reconsidering social cohesion: Developing a definition and analytical framework for empirical research. *Social Indicators Research, 75,* 273-302.

Change, G. E. (2016). Place, well-being, and fairness shape priorities for adaptation to climate change. *Global Environmental Change*, *38*, A1-A3.

Chapman, D.A., Trott, C.D., Silka, L., Lickel, B., Clayton, S. (2018). Psychological perspectives on community resilience and climate change. In S. Clayton & C. Manning (Eds.), *Psychology and climate change: Human perceptions, impacts, and responses* (pp. 267–288). Elsevier Academic Press. https://doi.org/10.1016/B978-0-12-813130-5.00011-4

City of Cincinnati, Office of Environment & Sustainability. (2023, April 19). *2023 Green Cincinnati Plan.* https://www.cincinnati-oh.gov/oes/climate/climate-protection-green-cincinnati-plan/

City of Cincinnati, Office of Environment & Sustainability. (2023). *Cincinnati tree inventory, canopy stats, and reforestation goals totals (2020-2030).* Retrieved September 28, 2023, from https://www.cincinnati-oh.gov/oes/equity/climate-equity-indicators/

City of Cincinnati, Office of Transportation & Engineering. (2021, September 22). Columbia Parkway landslide mitigation project wraps up, stabilizes two-mile stretch from Bains to Torrence [Press

release]. https://www.cincinnati-oh.gov/dote/news/columbia-parkway-landslide-mitigation-project-wraps-up-stabilizes-two-mile-stretch-from-bains-to-torrence/

City Planning Commission Cincinnati. (1925). *The official city plan of Cincinnati, Ohio.* Retrieved from https://www.cincinnati-oh.gov/sites/planning/assets/File/1925%20Official%20Plan%20of%20the%20City%20of%20Cincinnati.pdf

Climate Change Performance Index (CCPI). (2021). *United States.* https://ccpi.org/country/usa/

Cloutier, G., Joerin, F., Dubois, C., Labarthe, M., Legay, C., & Viens, D. (2015). Planning adaptation based on local actors' knowledge and participation: A climate governance experiment. *Climate Policy*, *15*(4), 458-474.

Community Building Institute (CBI). (2019). *Fair housing assessment for Cincinnati and Hamilton County.* Retrieved from https://choosecincy.com/wp-content/uploads/2019/12/fair_housing_assessment_cincinnati-hamilton_county.pdf.

Community Learning Center Institute (CLCI). (2019). *LPH resurgency plan.* Retrieved from https://www.cincinnati-oh.gov/sites/planning/assets/File/2019%20-%20LPH%20Resurgency%20Plan.pdf

Cote, M., & Nightingale, A. J. (2012). Resilience thinking meets social theory: Situating social change in socio-ecological systems (SES) research. *Progress in Human Geography, 36*(4), 475-489.

De Souza Briggs, X. (1997). Social capital and the cities: Advice to change agents. *National Civic Review*, *86*(2), 111-118.

Elias-Trostmann, K., Burke, L., Rangwala, L., & Cassel, D. L. (2018). *Stronger than the storm: Applying the urban community resilience assessment to extreme climate events.* World Resources

Institute. https://www.wri.org/research/stronger-storm-applying-urban-community-resilience-assessment-extreme-climate-events

Ensor, J., & Harvey, B. (2015). Social learning and climate change adaptation: Evidence for international development practice. *Climate Change, 6*(5), 509-522.

Even, T. L., Trott, C. D., Gray, E. S., Roncker, J., Basaraba, A., Harrison, T., Petersen, S., Sullivan, S., & Revis, S. (2021). *Climate Equity Indicators Report – 2021, City of Cincinnati.* The American Cities Climate Challenge Equity Capacity Building Fund, Bloomberg Foundation.

Fastiggi, M., Meerow, S., & Miller, T. R. (2021). Governing urban resilience: Organisational structures and coordination strategies in 20 North American city governments. *Urban Studies*, *58*(6), 1262-1285.

Fedele, G., Donatti, C. I., Harvey, C. A., Hannah, L., & Hole, D. G. (2019). Transformative adaptation to climate change for sustainable social-ecological systems. *Environmental Science & Policy*, *101*, 116-125.

Fiack, D., Cumberbatch, J., Sutherland, M., & Zerphey, N. (2021). Sustainable adaptation: Social equity and local climate adaptation planning in US cities. *Cities*, *115*, 103235.

Fong, W. K., Sotos, M., Doust, M., Schultz, S., Marques, A., Deng-Beck, C. (2021). *Global protocol for community-scale greenhouse gas inventories*. World Resources Institute. https://ghgprotocol.org/ghg-protocol-cities

Fowlie, M., Walker, R., & Wooley, D. (2020). *Climate policy, environmental justice, and local air pollution.* The Brookings Institution. https://www.brookings.edu/wp-content/uploads/2020/10/ES-10.14.20-Fowlie-Walker-Wooley.pdf

Freschi, G., Menegatto, M., & Zamperini, A. (2023). How can psychology contribute to climate change governance? A systematic review. *Sustainability*, *15*(19), 14273.

Freund, D. M. (2007). *Colored property*. University of Chicago Press.

Gago, E. J., Roldan, J., Pacheco-Torres, R., & Ordóñez, J. (2013). The city and urban heat islands: A review of strategies to mitigate adverse effects. *Renewable and Sustainable Energy Reviews*, *25*, 749-758.

Gifford, R. (2011). The dragons of inaction: psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, *66*(4), 290.

Goebbert, K., Jenkins-Smith, H. C., Klockow, K., Nowlin, M. C., & Silva, C. L. (2012). Weather, climate, and worldviews: The sources and consequences of public perceptions of changes in local weather patterns. *Weather, Climate, and Society*, *4*(2), 132-144.

Goffman, E. (1974). *Frame analysis: An essay on the organization of experience*. Cambridge, MA: Harvard University Press.

Gordon, C. J., Johnstone, A. F., & Aydin, C. (2011). Thermal stress and toxicity. *Comprehensive Physiology*, *4*(3), 995-1016.

Granberg, M., & Glover, L. (2021). The climate just city. *Sustainability, 13*(3), 1201.

Grothmann, T., & Michel, T. A. (2021). Participation for building urban climate resilience? Results from four cities in Germany. *Building Resilience to Natural Hazards in the Context of Climate Change: Knowledge, Integration*, *Implementation and Learning,* 173-208.

Groundwork USA. (2023). *About Climate Safe Neighborhoods.* https://groundworkusa.org/focus-areas/climate-safe-neighborhoods/about/

Groundwork Ohio River Valley. (2023). Climate Safe Neighborhoods. https://www.groundworkorv.org/climate-safe-neighborhoods

Gustafson, A., Rosenthal, S. A., Ballew, M. T., Goldberg, M. H., Bergquist, P., Kotcher, J. E., ... & Leiserowitz, A. (2019). The development of partisan polarization over the Green New Deal. *Nature Climate Change*, *9*(12), 940-944.

Hahn, M. B., Kemp, C., Ward-Waller, C., Donovan, S., Schmidt, J. I., & Bauer, S. (2020). Collaborative climate mitigation and adaptation planning with university, community, and municipal partners: A case study in Anchorage, Alaska. *Local Environment*, *25*(9), 648-665.

Hamilton County Regional Planning Commission. (2004). *State of the county report: Environmental and social justice* (Community Compass Report No. 16-7). https://www.hamiltoncountyohio.gov/common/pages/DisplayFile.aspx?itemId=5398105

Hegger, D. L., Mees, H. L., Driessen, P. P., & Runhaar, H. A. (2017). The roles of residents in climate adaptation: A systematic review in the case of The Netherlands. *Environmental Policy and Governance, 27*(4), 336-350.

Hoffman, J. S., Shandas, V., & Pendleton, N. (2020). The effects of historical housing policies on resident exposure to intra-urban heat: a study of 108 US urban areas. *Climate*, *8*(1), 12.

Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, *4*(1), 1-23.

Hoppe, K. A., Metwali, N., Perry, S. S., Hart, T., Kostle, P. A., & Thorne, P. S. (2012). Assessment of airborne exposures and health in flooded homes undergoing renovation. *Indoor Air*, *22*(6), 446-456.

Horn, D. (2022, February 27). Segregated Cincinnati: Why 1 in 3 people live in predominantly black or white neighborhoods. *Cincinnati Enquirer.*

Housing Opportunities Made Equal of Greater Cincinnati, Inc. (2022). *Roadmap for increasing black homeownership: Making generational wealth through home ownership available to everyone in Cincinnati and Hamilton County.* https://homecincy.org/other-resources/homeownership/

Hügel, S., & Davies, A. R. (2020). Public participation, engagement, and climate change adaptation: A review of the research literature. *Wiley Interdisciplinary Reviews: Climate Change*, *11*(4), e645.

Intergovernmental Panel on Climate Change (IPCC). (2014b). Annex II: Glossary. [Mach, K. J., Planton, S. & von Stechow, C. (eds.)]. *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 117–130). Geneva, Switzerland.

Intergovernmental Panel on Climate Change (IPCC). (2021). Summary for Policymakers. Climate Change 2021 – The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (pp. 3-32). Cambridge: Cambridge University Press.

Jabareen, Y. (2015). City planning deficiencies & climate change–the situation in developed and developing cities. *Geoforum*, *63*, 40-43.

Jagannathan, K., Arnott, J. C., Wyborn, C., Klenk, N., Mach, K. J., Moss, R. H., & Sjostrom, K. D. (2020). Great expectations? Reconciling the aspiration, outcome, and possibility of co-production. *Current Opinion in Environmental Sustainability*, *42*, 22-29.

Joshi, A., & Aoki, M. (2014). The role of social capital and public policy in disaster recovery: A case study of Tamil Nadu State, India. *International Journal of Disaster Risk Reduction*, *7*, 100–108.

Kahan, D. (2012). Why we are poles apart on climate change. *Nature*, *488*(7411), 255-255.

Kahneman D., Slovic P., & Tversky A. (Eds.). (1982). Judgment under uncertainty: Heuristics and biases. Cambridge University Press.

Klein, J., Araos, M., Karimo, A., Heikkinen, M., Ylä-Anttila, T., & Juhola, S. (2018). The role of the private sector and citizens in urban climate change adaptation: Evidence from a global assessment of large cities. *Global Environmental Change*, *53*, 127-136.

Lade, S. J., Walker, B. H., & Haider, L. J. (2020). Resilience as pathway diversity: Linking systems, individual, and temporal perspectives on resilience. *Ecology and Society, 25*(3).

Leiserowitz, A., Maibach, E. W., Rosenthal, S., Kotcher, J., Bergquist, P., Ballew, M., ... & Gustafson, A. (2019). *Climate change in the American mind: April 2019*. Yale Program on Climate Change Communication, George Mason University Center for Climate Change. https://climatecommunication.yale.edu/publications/climate-change-in-the-american-mind-april-2019/

Lieberknecht, K. (2022). Community-centered climate planning: Using local knowledge and communication frames to catalyze climate planning in Texas. *Journal of the American Planning Association*, *88*(1), 97-112.

Lieberknecht, K. (2023). Leading with local knowledge: Climate adaptation, local knowledge, and participation in Austin, Texas' network of plans and the co-designed climate navigators' tool and process. *Journal of Planning Education and Research*.

Malloy, J. T., & Ashcraft, C. M. (2020). A framework for implementing socially just climate adaptation. *Climatic Change*, *160*(1), 1-14.

Masten, A. S., Best, K. M., & Garmezy, N. (1990). Resilience and development: Contributions from the study of children who overcome adversity. *Development and Psychopathology*, *2*(4), 425-444.

Matin, N., Forrester, J., & Ensor, J. (2018). What is equitable resilience?. *World Development*, *109*, 197-205.

McAdam, D. (1986). Recruitment to high-risk activism: The case of freedom summer. *American Journal of Sociology, 92*, 64-90.

Measham, T. G., Preston, B. L., Smith, T. F., Brooke, C., Gorddard, R., Withycombe, G., & Morrison, C. (2011). Adapting to climate change through local municipal planning: Barriers and challenges. *Mitigation and Adaptation Strategies for Global Change, 16*(8), 89–909.

Meerow, S., Newell, J. P., & Stults, M. (2016). Defining urban resilience: A review. *Landscape and Urban Planning, 147*(March), 38–49.

Metropolitan Sewer District of Greater Cincinnati. (2022). *Environmental sustainability report.* https://prod.msdgc.org/sites/default/assets/downloads/about_msd/Who-We-Are/2022_MSD_Sustainability_Report.pdf

Meyer, M. A., Hendricks, M., Newman, G. D., Masterson, J. H., Cooper, J. T., Sansom, G., Gharaibeh, N., Horney, J., Berke, P., van Zandt, S. and Cousins, T. (2018). Participatory action research: Tools for disaster resilience education. *International Journal of Disaster Resilience in the Built Environment*, *9*(4/5), 402-419.

Mill Creek Alliance. (2023). *History.* https://www.themillcreekalliance.org/history

Mohai, P., Pellow, D., & Roberts, J. T. (2009). Environmental justice. *Annual Review of Environment and Resources, 34*, 405–30.

Moser, S. C., & Ekstrom, J. A. (2010). A framework to diagnose barriers to climate change adaptation. *Proceedings of the National Academy of Sciences*, *107*(51), 22026-22031.

Mostert, E., Pahl-Wostl, C., Rees, Y., Searle, B., Tàbara, D., & Tippett, J. (2007). Social learning in European river-basin management: Barriers and fostering mechanisms from 10 river basins. *Ecology and Society*, *12*(1).

Nabi, R. L., Gustafson, A., & Jensen, R. (2018). Framing climate change: Exploring the role of emotion in generating advocacy behavior. *Science Communication*, *40*(4), 442-468.

Nisbet, M. C. (2009). Communicating climate change: Why frames matter for public engagement. *Environment: Science and Policy for Sustainable Development*, *51*(2), 12-23. https://doi.org/10.3200/ENVT.51.2.12-23

Ntontis, E., Drury, J., Amlôt, R., Rubin, G. J., & Williams, R. (2020). What lies beyond social capital? The role of social psychology in building community resilience to climate change. *Traumatology*, *26*(3), 253.

O'Brien, K. & Sygna, L. (2013). Responding to climate change: The three spheres of transformation. *Proceedings of Transformation in a Changing Climate*, *16*, 23.

Olsson, L., Jerneck, A., Thoren, H., Persson, J., & O'Byrne, D. (2015). Why resilience is unappealing to social science: Theoretical and empirical investigations of the scientific use of resilience. *Science Advances*, *1*(4), e1400217.

Oteros-Rozas, E., Martín-López, B., Daw, T. M., Bohensky, E. L., Butler, J. R., Hill, R., Martin-Ortega, J., Quinlan, A., Ravera, F., Ruiz-Mallén, I. and Thyresson, M. (2015). Participatory scenario planning in place-based social-ecological research: Insights and experiences from 23 case studies. *Ecology and Society*, *20*(4).

Owen, G. (2020). What makes climate change adaptation effective? A systematic review of the literature. *Global Environmental Change, 62*, 102071.

Palermo, V., & Hernandez, Y. (2020). Group discussions on how to implement a participatory process in climate adaptation planning: A case study in Malaysia. *Ecological Economics*, *177*, 106791.

Pearce, T. D., Ford, J. D., Laidler, G. J., Smit, B., Duerden, F., Allarut, M., Andrachuk, M., Baryluk, S., Dialla, A., Elee, P. and Goose, A. (2009). Community collaboration and climate change research in the Canadian Arctic. *Polar Research*, *28*(1), 10-27.

Pelling, M., O'Brien, K., and Matyas, D. (2015). Adaptation and transformation. *Climatic Change, 133*, 113–127.

Procentese, F., & Gatti, F. (2022). Sense of responsible togetherness, sense of community, and civic engagement behaviours: Disentangling an active and engaged citizenship. *Journal of Community & Applied Social Psychology*, *32*(2), 186-197.

Putnam, R.D. (1993). The prosperous community: Social capital and public life. *The American Prospect, 4*(13).

Raub, K. B., Platter, H., O'Mara, E., & Panikkar, B. (2023). Evaluating the incorporation of climate justice concerns within resilience plans across eleven U.S. coastal cities. *Journal of Climate Resilience & Climate Justice*, *1*, 33–54.

Reidmiller, D. R., Avery, C. W., Easterling, D. R., Kunkel, K. E., Lewis, K. L., Maycock, T. K., & Stewart, B. C. (2017). *Impacts, risks, and adaptation in the United States: Fourth national climate assessment, volume II*. U.S. Global Change Research Program, National Oceanic and Atmospheric Administration, National Aeronautics and Space Administration. https://doi.org/10.7930/NCA4.2018

Revi, A., Satterthwaite, D., Aragón-Durand, F., Corfee-Morlot, J., Kiunsi, R. B., Pelling, M., Roberts, D., Solecki, W., Gajjar, S. P. and Sverdlik, A. (2014). Towards transformative adaptation in cities: The IPCC's fifth assessment. *Environment and Urbanization*, *26*(1), 11-28.

Rothstein, R. (2017). *The color of law: A forgotten history of how our government segregated America*. Liveright Publishing.

Rowe, G., & Frewer, L. J. (2000). Public participation methods: A framework for evaluation. *Science, Technology, & Human Values*, *25*(1), 3-29.

Ruiz-Mallén, I. (2020). Co-production and resilient cities to climate change. In J. Nared & D. Bole (Eds.), *Participatory research and planning in practice.* (pp. 1-12). Springer Nature. https://doi.org/10.1007/978-3-030-28014-7

Ruiz-Mallén, I., Fernández-Llamazares, A., Reyes-García, V. (2017) Unravelling local adaptive capacity to climate change in the Bolivian Amazon: The interlinkages between assets, conservation and markets. *Climatic Change, 140*(2), 227–242.

Sarzynski, A. (2015). Public participation, civic capacity, and climate change adaptation in cities. *Urban Climate*, *14*, 52-67.

Satorras, M., Ruiz- Mallén, I., Monterde, A., & March, H. (2020). Co-production of urban climate planning: Insights from the Barcelona climate plan. *Cities*, *106*, 102887.

Shandas, V., Voelkel, J., Williams, J., & Hoffman, J. (2019). Integrating satellite and ground measurements for predicting locations of extreme urban heat. *Climate*, *7*(1), 5.

Shi, L., Chu, E., Anguelovski, I., Aylett, A., Debats, J., Goh, K., Schenk, T., Seto, K. C., Dodman, D., Roberts, D. and Roberts, J. T. (2016). Roadmap towards justice in urban climate adaptation research. *Nature Climate Change, 6*(2), 131–137.

Shimada, G. (2015). The role of social capital after disasters: An empirical study of Japan based on Time-Series-Cross-Section (TSCS) data from 1981 to 2012. *International Journal of Disaster Risk Reduction, 14*, 388–394.

Solhaug, T. (2006). Knowledge and self-efficacy as predictors of political participation and civic attitudes: With relevance for educational practice. *Policy Futures in Education*, *4*(3), 265-278.

A statistical tour of Cincinnati: Breaking down the neighborhoods. (2022, February 24). *The Cincinnati Enquirer.* https://www.cincinnati.com/storytelling/cincinnati-neighborhoods/

Stults, M., & Woodruff, S. C. (2017). Looking under the hood of local adaptation plans: Shedding light on the actions prioritized to build local resilience to climate change. *Mitigation and Adaptation Strategies for Global Change*, *22*(8), 1249-1279.

T.Y. Lin International. (2020). *Western Hills Viaduct Alternative Evaluation Report.* City of Cincinnati, Hamilton County Ohio. https://www.cincinnati-oh.gov/sites/dote/assets/File/Bridges/WHV_Final%20AER_2020-10-12_RD_Website.pdf

Tam, K. P., Leung, A. K. Y., & Clayton, S. (2021). Research on climate change in social psychology publications: A systematic review. *Asian Journal of Social Psychology*, *24*(2), 117-143.

Thomas, K. A., & Warner, B. P. (2019). Weaponizing vulnerability to climate change. *Global Environmental Change*, *57*, 101928.

Uittenbroek, C. J., Mees, H. L., Hegger, D. L., & Driessen, P. P. (2019). The design of public participation: Who participates, when and how? Insights in climate adaptation planning from the Netherlands. *Journal of Environmental Planning and Management, 62*(14), 2529–2547.

United Nations (UN), Department of Economic and Social Affairs, Population Division. (2019). *World urbanization prospects 2018*: *Highlights* (Report No. ST/ESA/SER.A/421). https://population.un.org/wup/publications/Files/WUP2018-Highlights.pdf

United Nations (UN). (2023). *The sustainable development goals report 2023: Special edition.* https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf

U.S. Census Bureau (2020a). *2020 decennial census*. U.S. Department of Commerce. Retrieved from https://www.cincinnati-oh.gov/planning/maps-and-data/census-demographics/2020-census-data/

U.S. Census Bureau (2020b). *2016-2020 American community survey 5-Year estimates*. U.S. Department of Commerce. Retrieved from https://www.cincinnati-oh.gov/planning/maps-and-data/census-demographics/2020-census-data/

U.S. Census Bureau. (2023, June 29). *2020 Census urban area facts*. U.S. Department of Commerce. https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/2020-ua-facts.html

U.S. Environmental Protection Agency (EPA). (2008). *Reducing urban heat islands: Compendium of strategies.* https://www.epa.gov/heat-islands/heat-island-compendium

U.S. Environmental Protection Agency (EPA). (2014). *National air toxics assessment (NATA): Assessment results.* https://www.epa.gov/national-air-toxics-assessment/2014-nata-assessment-results#emissions

U.S. Environmental Protection Agency (EPA). (2016). *What climate change means for Ohio.* https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-oh.pdf

U.S. Environmental Protection Agency (EPA). (2023). *Ten things you should know about mold.* https://www.epa.gov/mold/ten-things-you-should-know-about-mold

U.S. Global Change Research Program. (2018a). *Fourth national climate assessment volume II: Chapter 13: Air quality*. https://nca2018.globalchange.gov/chapter/13/

Uzzell, D., Pol, E., & Badenas, D. (2002). Place identification, social cohesion, and environmental sustainability. *Environment and Behavior*, *34*(1), 26-53.

Van Kerkhoff, L. E., & Lebel, L. (2015). Coproductive capacities: Rethinking science-governance relations in a diverse world. *Ecology and Society*, *20*(1).

Vaughn, L. M., & Jacquez, F. (2020). Participatory research methods–choice points in the research process. *Journal of Participatory Research Methods*, *1*(1), 13244.

Vogel, B., & Henstra, D. (2015). Studying local climate adaptation: A heuristic research framework for comparative policy analysis. *Global Environmental Change*, *31*, 110-120.

Wald, D. M., Johnston, E. W., Wellman, N., & Harlow, J. (2021). How does personalization in news stories influence intentions to help with drought? Assessing the influence of state empathy and its antecedents. *Frontiers in Communication*, *5*, 588978.

Wamsler, C. (2017). Stakeholder involvement in strategic adaptation planning: Transdisciplinarity and co-production at stake?. *Environmental Science & Policy, 75*, 148-157.

Wamsler, C. & Osberg, G. (2022), Transformative climate policy mainstreaming—engaging the political and the personal. *Global Sustainability, 5*, e13.

Wardekker, A. (2021). Contrasting the framing of urban climate resilience. *Sustainable Cities and Society*, *75*, 103258.

Watts, R. J., & Halkovic, A. (2022). Sociopolitical development and social identities. *Journal of Research on Adolescence*, *32*(4), 1270-1279.

Watts, R. J., Williams, N. C., & Jagers, R. J. (2003). Sociopolitical development. *American Journal of Community Psychology*, *31*(1-2), 185-194.

Wheeler, S. M. (2008). State and municipal climate change plans: The first generation. *Journal of the American Planning Association, 74*(4): 481–496.

Whitmarsh, L., & Capstick, S. (2018) Perceptions of climate change. In S. Clayton & C. Manning (Eds.), *Psychology and climate change: Human perception, impacts and responses* (46–81). Academic Press.

Wong, K. V., Paddon, A., and Jimenez, A. (2013) Review of world urban heat islands: Many linked to increased mortality. *Journal of Energy Resources Technology, 135*(2).

Woodruff, S. C., Bowman, A. O. M., Hannibal, B., Sansom, G., & Portney, K. (2021). Urban resilience: Analyzing the policies of US cities. *Cities*, *115*, 103239.

Woodruff, S. C., & Stults, M. (2016). Numerous strategies but limited implementation guidance in US local adaptation plans. *Nature Climate Change, 6*(8), 796–802.

Yancey, E. (2016, December 6). Rising from the ashes: Unknowns of Queen City Barrel fire still concern Lower Price Hill residents. *WCPO.* https://www.wcpo.com/about-us/history/-rising-from-the-ashes-unknowns-of-queen-city-barrel-fire-still-concern-lower-price-hill-residents

Yuen, T., Yurkovich, E., Grabowski, L., & Altshuler, B. (2017). *Guide to equitable, community-driven climate preparedness planning.* Urban Sustainability Directors Network. https://www.usdn.org/uploads/cms/documents/usdn_guide_to_equitable_community-driven_climate_preparedness-_high_res.pdf

Zen, I. S., Al-Amin, A. Q., & Doberstein, B. (2019). Mainstreaming climate adaptation and mitigation policy: Towards multi-level climate governance in Melaka, Malaysia. *Urban Climate*, *30*, 100501.

Appendix A

EAG[vi] Resident Interview Protocol

PART 1. The Story of your Involvement

The first part of the interview is about getting to know you a little bit and how you got involved in the EAG.

1. Tell me about your role in the Climate Safe Neighborhoods partnership.
    a. How did you hear about the EAG?
    b. How well did you understand your role?
2. Did you participate for the full duration of the EAG, from mid-February until the end of April?
    c. If you left the group early, can you say why?
    d. What affected whether you attended the meetings?
3. What made you want to participate in your neighborhood's EAG?
    e. In other words, what motivated or led up to your involvement?
4. Before you participated, what were your expectations (or hopes) for the EAG?

PART 2. Process

This section asks for feedback on what worked and what didn't and asks for your recommendations for improving the next round of EAG meetings in another neighborhood.

1. If we could start the EAG all over again, what would you keep the same? (Why?)
    If not addressed: Were any of the activities, tools, or homework assignments particularly useful to you? If so, which ones and why?
    If not addressed: Do you feel that 6 meetings was the appropriate amount of time to spend on this process? How did you feel about the length of the meetings?
    How did you feel about breakout vs. whole-group sessions?
    Would you prefer to meet over Zoom or in-person?
    Did you like the binder?
    Did you feel like anything was missing?
2. If we could start the EAG all over again, what would you change about it? (Why?)
3. Is there any information you wish you had received but didn't? Any topics that should have been covered but weren't?
4. Did you talk about the timeline of how long it might take to do the things in the resilience plan?
5. What was the most important part of the meetings overall for you? (Why?)
6. What was the most important thing you learned?
    a. *If clarification is needed:* Some examples might be learning about how climate change affects your community? Learning about how your neighborhood compares to other neighborhoods? Learning how previous policies led to current vulnerabilities? Presentations from community groups? Learning to advocate for

your neighborhood? Connecting to other people and organizations? Learning about strategies to be more climate resilient?

7. What do you feel was successful about the EAG?
8. We want the EAGs to represent all kinds of people in the neighborhood. Do you feel like there was a good mix of participants in the EAG? Did you feel like anyone was missing?
Do you have any advice for future EAGs on how to find people to represent the neighborhood?

Part 3. Equity

This part explores equity within the EAG, so how inclusive the meetings were and who got to make decisions, as well equity on a larger level, exploring whether the EAG encourages a more equitable city planning process.

Because this section deals with equity, as a reminder, we're going to give a definition here. Equity can be defined as achieving equal outcomes for people or groups of people. It aims for fairness by treating everyone equitably based on their circumstance: removing what puts someone at a disadvantage and providing what they need to succeed.

1. To what extent do you feel that you were able to articulate your priorities for your neighborhood? Do you feel your voice was heard?
    a. *If not addressed:* To what extent do you feel that you shared the power to make decisions within the group?
2. Do you feel that the group was given what it needed to be able to make the climate resilience plan?
    a. *If not addressed:* Do you feel that you were given what you needed to fulfill your role? What would you change to make your role more equitable? What would you change to make the neighborhood planning more equitable?
3. Do you think the group should have been larger even though that would mean less speaking time for each person?
4. How well were you able to connect to the ideas that were presented in the meetings? Was there anything that was confusing or didn't make sense?

Part 4. Impact and Outcomes

This section explores what came out of the Climate Safe Neighborhoods partnership, in terms of personal and community impacts, educational impacts, and plans for Lower Price Hill.

1. What were the biggest things you learned through participating in the EAG? Systems of how things work? Network of local resources?
    a. *If not addressed:* About climate change? About Cincinnati? About your neighborhood? About redlining? About health?
2. Did you learn anything surprising?
3. Did anything you learn stand out and make this project feel important to you?
4. I know that the group discussed both the history of your community and future plans for your community. Would you have preferred to focus more or less on either history or future? Did you feel that the information was balanced between history and future?
5. How did your participation in the EAG affect you personally?

   b. *If clarification is needed:* Did it change how you think or feel about anything?
   c. *If not addressed:* Did being in the EAG lead to any changes in your behavior?

6. Did the EAG experience impact your sense of connection to your community?
7. What do you feel are the best ways for the city to communicate information to the neighborhood about ongoing work and progress with the resilience plan?
   a. What more do you want to know?
8. What do you see as the immediate impacts for you and your community from the EAG?
9. What do you see as the long-term impacts for you and your community from the EAG?

Part 5. Next Steps and Community Toolkit

This part has to do with the future and what you think should be done next.

1. What do you see as the next steps toward enacting the climate resilience plan?
2. Do you want to be a part of working on the resilience plan? How do you envision your role?
   a. Do you have any ideas on ways to reach more people and communicate to them what the EAG did?
3. What additional information or tools would you like to have in order to continue this work?
4. Imagine that you are going to EAG meetings, but they aren't being facilitated by Groundwork or Green Umbrella or the city. You are following a step-by-step guide that's leading you and your neighbors with instructions on how to learn what climate change is doing to your neighborhood and how to make a resilience plan. What key information needs to be included in the toolkit guide so that it's useful?

   For instance:

   a. Format: What format would be easiest to use: Website? Brochure? Downloadable PDF?
   b. Content: What kind of information would be necessary for community members to learn from the toolkit? Is there anything in particular that you think would be hard for community members to do or learn on their own?
   c. Process: What advice can you give to help the next neighborhood have a successful EAG?

Conclusion: Thank you! That's the last question I had for you. Is there anything I didn't ask about that you'd like to add? Anything you feel is important that hasn't come up yet?

Appendix B

EAG Organizer Interview Protocol

PART 1. The Story of your Involvement

The first part of the interview is about getting to know you a little bit and how you got involved in the EAG.

1. Tell me about your role in the Climate Safe Neighborhoods partnership.
    a. How did you get involved with CSN?
    b. How well did you understand your role throughout the process?
2. Did you participate for the full duration of the EAG, from mid-Feb until the end of April?
    a. If not, at what point in the process did you become involved?
3. What made you want to participate in the CSN partnership?
    b. In other words, what motivated or led up to your involvement?
4. What were your expectations (or hopes) for convening an EAG in LPH?

PART 2. Process

This section asks for feedback on what worked and what didn't as well as recommendations for improving Climate Safe Neighborhoods for the next round in another neighborhood.

1. What do you feel was successful about the EAG (Why?)
2. What do you feel could be improved about the EAG? (Why?)
3. What would you change?
4. What do you feel was the most important part of the EAG? (Why?)
5. We want the overall EAG process to balance depth vs. breadth. In your opinion, are we reaching enough people or should we be engaging more via EAG meetings? Do you have any ideas on ways to reach more people?
    a. *If not addressed:* Were six meetings enough? Were they spaced out correctly, in your opinion?
6. What do you feel is the best way to share information with community members about the contexts of climate change and neighborhood vulnerabilities?
    a. *If clarification is needed:* How do we make technical information about local climate impacts more accessible to community residents?
    => Environmental info, Demographic info, Historical info
    b. *If not addressed:* What external resources are available for people to educate themselves on climate science and the local context when the group is self-directed using the toolkit?
7. Do you feel that the EAG balanced time appropriately between educating residents on what's happened in the past and what actions can be taken in the future?

Part 3. Equity

This part explores how engaged people felt by the meetings, who got to make decisions, and how inclusive the meetings were.

Because this section deals with equity, as a reminder, I'll give you our definition here. Equity can be defined as achieving equal outcomes for people or groups of people. It aims for fairness by treating everyone equitably based on their circumstance: removing what puts someone at a disadvantage and providing what they need to succeed.

1. In your view, how well did the EAG address issues of equity?
    a. *If clarification is needed:* Do you feel that the participants represented a fair sampling of the neighborhood? Do you feel that members were given what they needed to fulfill the role expected of them? Do you feel that the group was given what they needed to make a realistic climate resilience plan for LPH?
    b. *If not addressed:* What would you change to make member roles more equitable?
2. What would you change to make neighborhood planning in the city more equitable?
3. What level of decision-making power did EAG participants have regarding the strategies they decided upon in their neighborhood plan?
4. To what extent do you feel the meetings were engaging and accessible to community members? Did any of the ideas seem confusing to the members?
    a. *If clarification is needed:* In your view, were community members able to connect to the ideas?

Part 4. Impact and Outcomes

1. What do you see as the immediate impacts for the community from the EAG?
2. What do you hope will be the long-term impacts for the community from the EAG?
3. Did the EAG discuss a timeline of how long it might reasonably take to implement some of the resilience strategies?
4. Do you have any ideas on how to share the resilience plan with the neighborhood at large?
5. How do you feel the EAG did in meeting its stated purposes of (1) creating a climate resilience plan that uplifts the community voice and meets its needs and (2) finding the best way to engage communities in climate planning?
    a. What metrics would you like to have in the future to monitor progress?
6. Would you say this process impacted you in any way? How so?

Part 5. Next Steps and Community Toolkit

This part has to do with the future and what you think should be done next.

1. What do you see as the next steps toward enacting the climate resilience plan in LPH?
    a. How will implementation of the climate resilience plan be monitored?
    b. How will progress be evaluated?
    c. Will steps be taken to define and measure equity impacts?
    d. Are EAG members involved with implementing changes or evaluating progress?
2. What is the process for integrating the neighborhood resilience plans into the Green Cincinnati Plan 2023?

    a. How will the neighborhood resilience plans be funded?
3. Who needs to be on board for next steps to be successful?
4. What are your hopes for the CSN partnership as a whole?
5. Imagine that a future EAG is following a guide that instructs them on how to independently run their own group and make a neighborhood resilience plan, step by step. Is there anything that you think would be difficult for community members to do on their own?
    a. *If not addressed:* What would help with that?
6. What advice can you give to help the next neighborhood have a successful EAG?

Conclusion: Thank you! That's the last question I had for you. Is there anything I didn't ask about that you'd like to add? Anything you feel is important that hasn't come up yet?

---

[i] The 2023 Green Cincinnati Plan includes the development of resilience hubs, combination support centers/educational spaces that increase resident emergency preparedness, as strategies for social cohesion and community stabilization.

[ii] As of October 2023, Groundwork ORV has hired two former CAG members as resident community organizers for their neighborhoods of Lower Price Hill and Bond Hill/Roselawn.

[iii] As of September 2023, Groundwork ORV reported 77 street trees planted and the installation of a green roof on Oyler School as outcomes in Lower Price Hill.

[iv] CSN is building regional alliances with CAG neighborhoods set to expand past the City's jurisdiction into Northern Kentucky and Norwood, Ohio.

[v] As of October 2023, seven more Cincinnati neighborhoods have participated in CAGs.

[vi] At the time of its engagement in 2021, Climate Safe Neighborhoods referred to the LPH group as an Equity Advisory Group (EAG), after which point CSN group title was renamed as a Climate Advisory Group (CAG). The appendices retains the original term and the paper uses the current term.